JULY 23, 1951

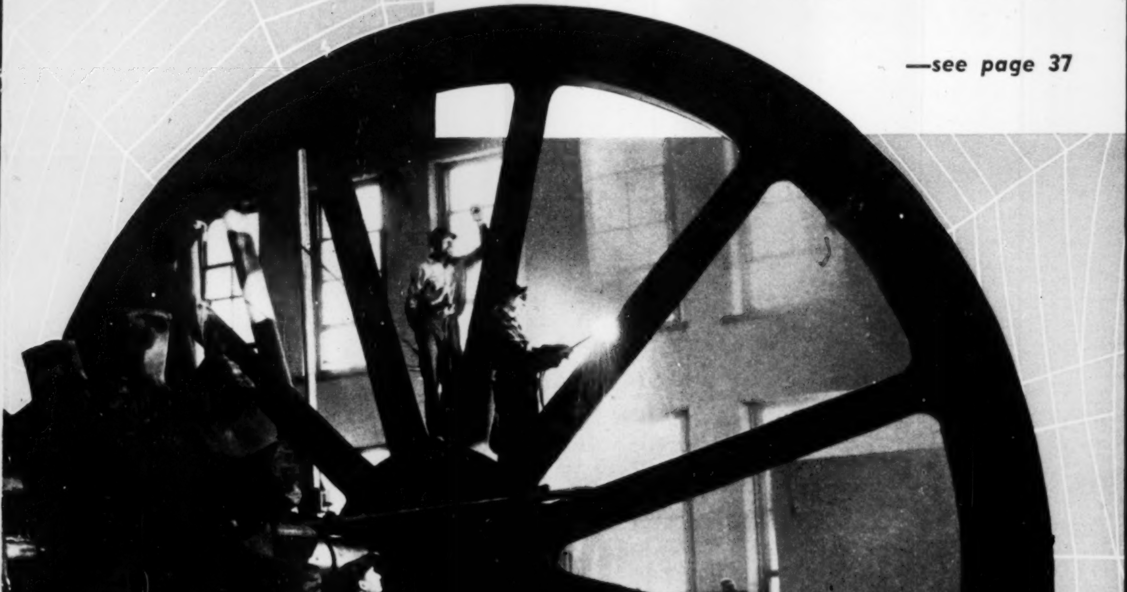
# STEEL

THE WEEKLY MAGAZINE OF METALWORKING

## Move Dormant Scrap

### TO KEEP THE WHEELS ROLLING

—see page 37



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Aircraft Subcontracting Is Here To Stay, p. 48

Pretreatment for Cold Working, p. 71

This New QUICKWORK STAMPING TRIMMER

*is* **BIG NEWS** TODAY

The new Quickwork Stamping Trimmer represents the latest development in versatility and economy in metalworking. Investigate this machine of a "thousand uses." Learn for yourself how the Quickwork accurately trims, forms, and beads complicated stampings of steel, stainless steel, and aluminum alloys with equal ease.

No expensive dies to fool with, just simple adaptable fixtures to guide your intricate stampings throughout an entire pass. Help yourself to a bigger stock pile of finished work by writing, today, for Bulletin QW-123.

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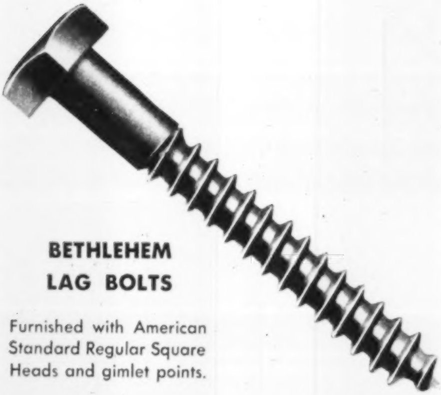

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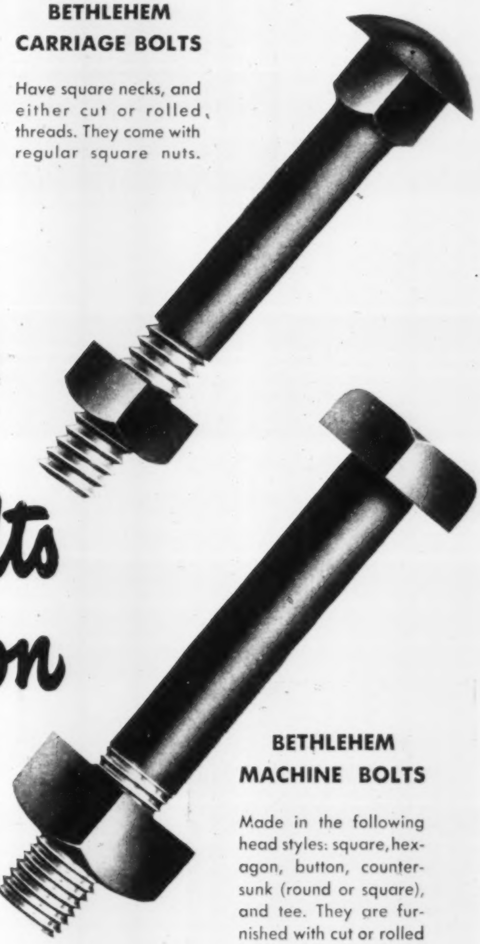

# Standard Bolts for Construction

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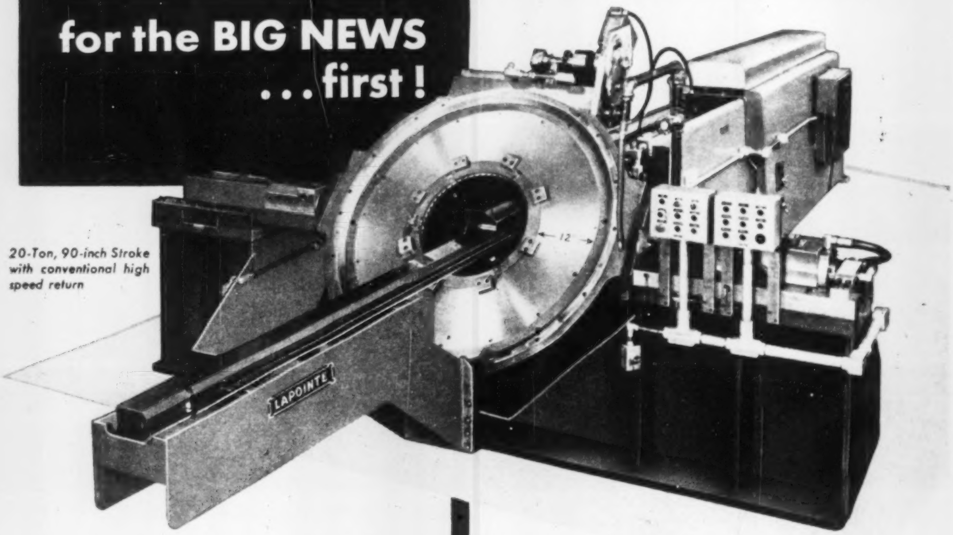

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*Write for illustrated technical Bulletin HP-3*

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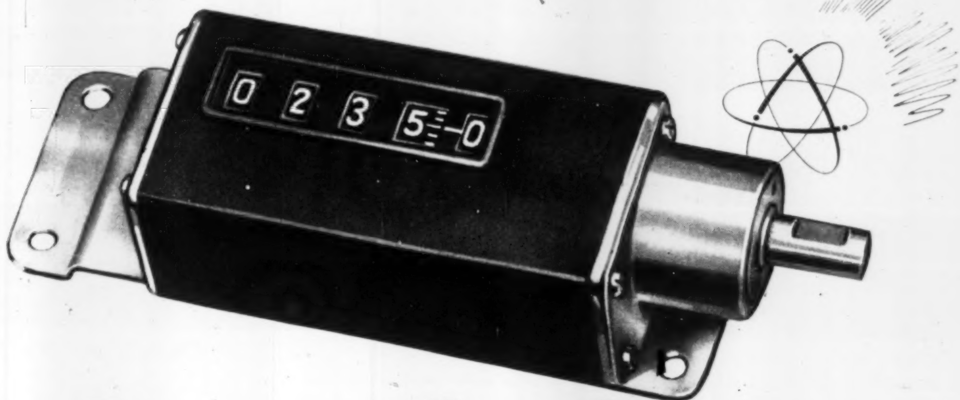

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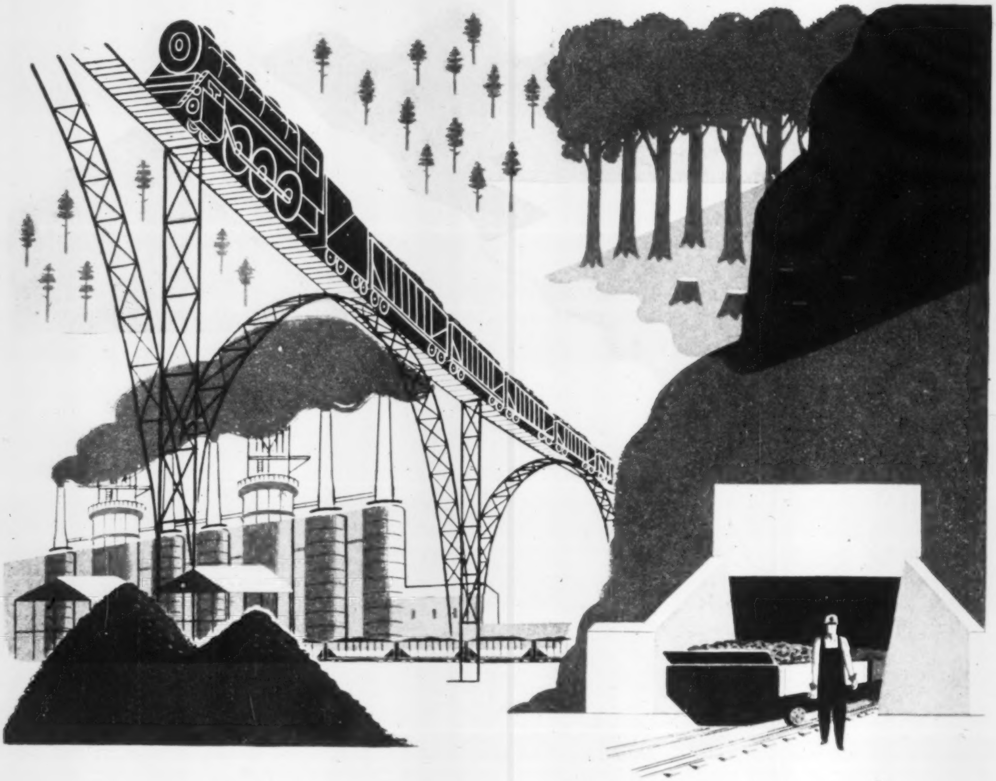

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**STEEL**
*The Weekly Magazine of Metalworking*

**VOL. 129 NO. 4** **JULY 23, 1951**

# THIS WEEK IN METALWORKING

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***Next Week*** **. . . More Steel Being Made by Electric Furnaces . . . Production Hardening Tank Rings . . . Wax Emulsions Effective as Drawing Lubricants . . . Conveyor System Handles Screw Machine Parts 50 Per Cent Faster**

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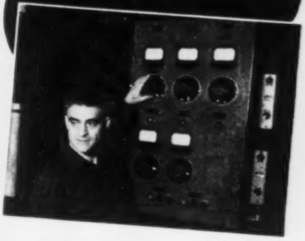

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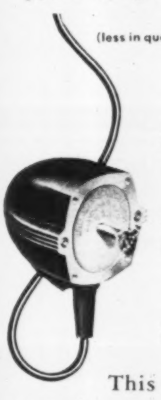

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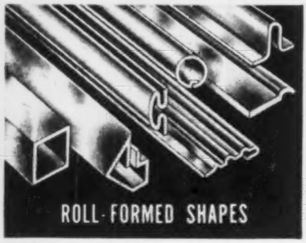

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# *Behind the Scenes . . .*

## Aviator-Writer

For all we know, the gentlemen you see in the accompanying photograph may be just starting or just finishing a job that will eventually appear in the pages of STEEL. They are George R. Reiss (right) and Lloyd S. Jones. Among his many activities, George is Youngstown correspondent for STEEL (for nearly 20 years), industrial and aviation editor of the *Youngstown Vindicator* and the pilot half of an aerial photographic team whose pictures appear regularly in the *Vindicator*, occasionally in STEEL and other publications. Lloyd Jones is a *Vindicator* staff photographer.

George learned morse telegraphy when he was 14 and worked his way through high school as a telegrapher after school and summers. When he was 17, he ran a telegraph office while going to school. After he finished school he worked as a telegraph operator for Associated Press and Consolidated Press Association. He began writing occasional pieces for Consolidated and that got him a job as a reporter. After working on various papers, he landed permanently with the *Vindicator*.

George's interest in aviation dates back about 23 or 24 years when he rode in the mail pit of a mail plane on the Pittsburgh-Cleveland run. He learned to fly soon afterward and has been flying ever since. He now owns part interest in a four-passenger Stinson Voyager plane which he often uses for business travel.

His interest in aviation and industrial reporting has taken him all over the world. In June, 1945, just as war in Europe was ending, he went on a 20,000 mile air trip through Europe as one of a group of 12 aviation writers who were evaluating strategic air bombing. A series based on that trip appeared in STEEL. The following year, he went to the atomic bomb experiment at Bikini on the *USS Appalachian*.

On his European trip, George, along with other aviation writers, visited Herman Goering's villa in Berlin just a few days after the Russians let the first Americans into the city. Some of the writers began picking up souvenirs, one fellow collecting an x-ray picture of Goering's teeth. George picked up a large volume in German showing all records of the Goering family's industrial holdings. He got it as far as the gate, then thought, "Oh, well, I can't read German. What's the use of this?" He tossed it over the fence. The book was worth a fortune later.

## The Good Old Days

A while back residents of Bethlehem, N. H., had a chance on Sunday to see how much freedom they have. Old-time blue laws were enforced for two hours. It was illegal to buy cigarettes, go swimming, play golf or sing—unless it was a hymn.

We haven't heard how the Bethlehem residents made out, but we know what we'd do if faced with such bans. We'd take a two-hour nap.

## Literary Man

Always interested in the Arts, we are delighted to pass this bit of information along: Robert L. Martin, personnel director of Sterling Grinding Wheel Division, Tiffin, O., has just had his first novel, *Dark Dream*, accepted for publication. It's detective fiction and will bear the imprint of Dodd Mead & Co. Our man has been writing short stories for years in his spare time for various detective story magazines.

## Puzzle Corner

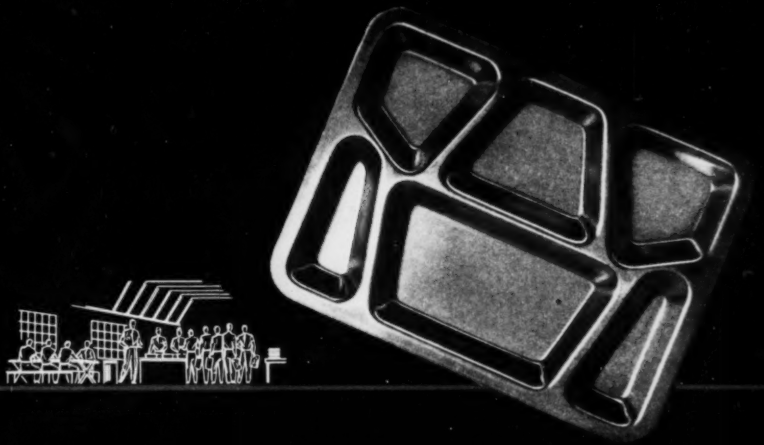
First in with the answer to the July 9 problem was Charles E. Norton of Highland Park, Ill., who correctly stated that the most efficient angle of climb for the airplane is 32 degrees. The rate of climb at that angle is 12,000 feet per minute.

A farmer has three sons and 150 eggs. He gives the first son 85, the second son 50 and the third 15 eggs and tells them to sell the eggs at a certain price per dozen and at a certain price for each odd egg. All eggs are sold accordingly and each son delivers the same amount of cash to his father. What are the selling prices?

Shrdlu

(Metalworking Outlook—Page 29)

# Popular Pattern in Modern Dinnerware . . .



## SHARON* STAINLESS and RUST-RESISTANT ALLOYS ADD LIFE TO MILITARY MESS GEAR

An army travels on its stomach. Modern military leaders know the truth to that remark. Sanitation is of utmost importance. The stainless mess trays are extremely easy to clean, and they can absorb punishment. The field kits are light in weight, tough and resistant to rust even under the corrosive conditions found on the salt water washed islands of the Pacific.

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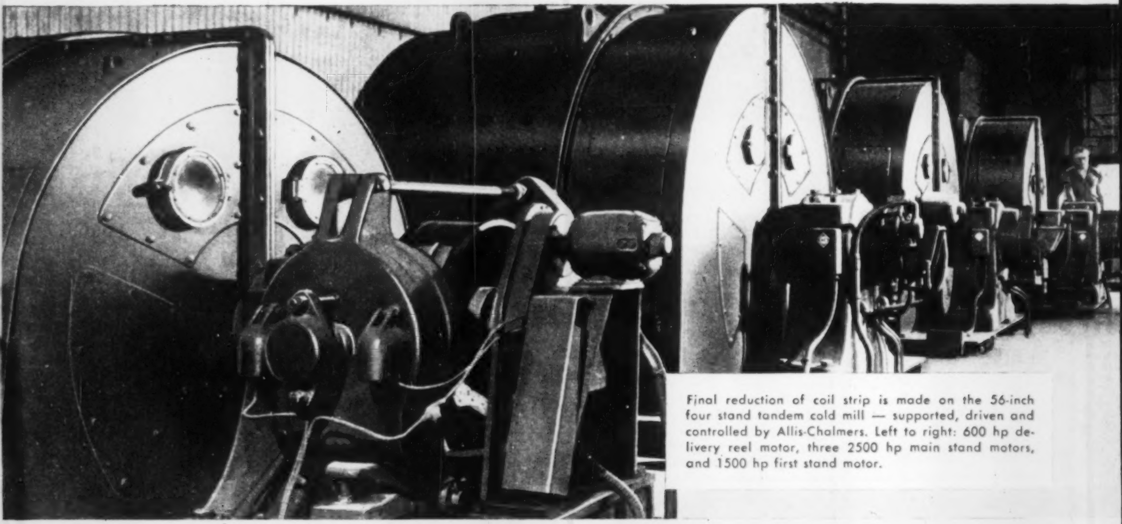
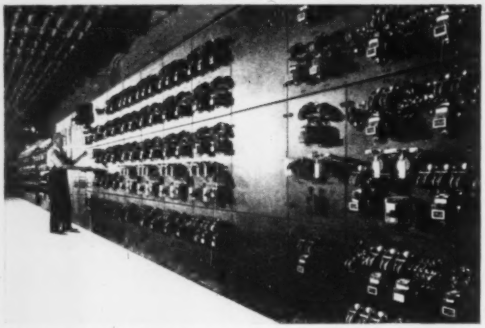
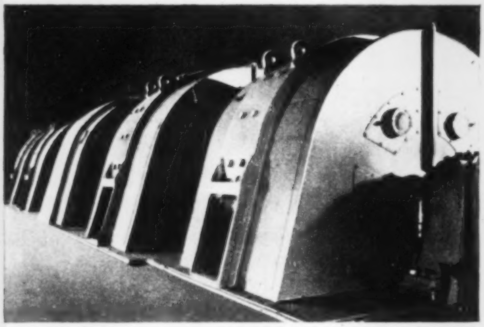
# ALLIS-CHALMERS SPEEDS



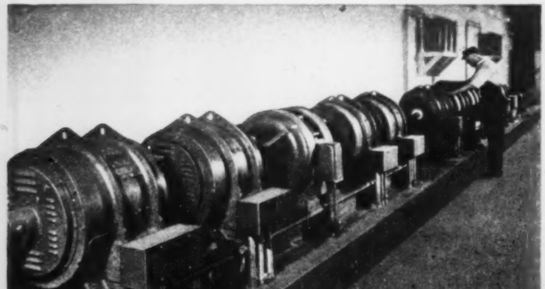
Final reduction of coil strip is made on the 56-inch four stand tandem cold mill — supported, driven and controlled by Allis-Chalmers. Left to right: 600 hp delivery reel motor, three 2500 hp main stand motors, and 1500 hp first stand motor.



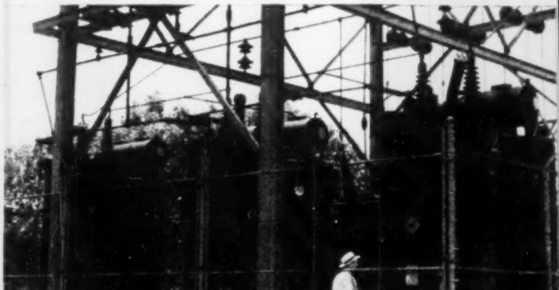
Variable voltage dc control board for 56-inch tandem cold mill. Allis-Chalmers supplied all controls and switchgear — as well as the main and auxiliary drives — for processing the steel from the hot mill to shipping.



The individual generator system of support and control is employed on the cold reduction mill, which was first placed in operation in 1947. The Allis-Chalmers supporting 7-machine, 7750 kw M-G set is seen here.



*Regulex* rotating amplifier exciter sets provide variable voltage dc control of the drive motors and M-G set. Wide use is made here of *Regulex* exciter sets to control tension, reel buildup and speed matching.



These three Allis-Chalmers 4000 kva oil immersed, self-cooled transformers handle the incoming power for the cold mill. Transmission power at 69 kv is transformed to 6900 volts for the synchronous M-G set.

SINCE
GRANITE CITY STEEL
1878

# STEEL ROLLING

An aggressive, unafraid approach to increased demand is typical of the Granite City Steel Company. Completing a $26,000,000 expansion only two years ago, and with a $6,000,000 program nearing completion, the company now has announced a further $50,000,000 expansion! Capacity — mostly in coils, sheets and tinplate — will then be well over a million tons a year.

Operations pictured were included in the recently completed expansion. They illustrate the wide range of equipment Allis-Chalmers has supplied the Granite City Steel Company and offers to the American steel industry in its expansion efforts.

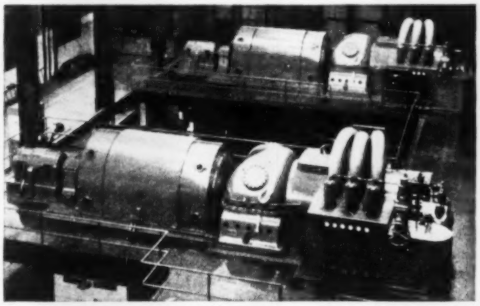
Complete electrical equipment — from the hot strip mill to shipping — was supplied by Allis-Chalmers! This broad, quality line of equipment has proved so satisfactory that the steel company has specified Allis-Chalmers substations and power transformers, as well as drives, controls and auxiliaries for the roughing and reversing blooming mills, for the *next* expansion program.

Constant growth has characterized this progressive midwestern company ever since its founding in 1878. During that time steel rolling at Granite City has gone from single stand, two high hand mills of under a ton per hour capacity to the modern four stand, four high tandem cold mill (left) of 45 tons per hour capacity.

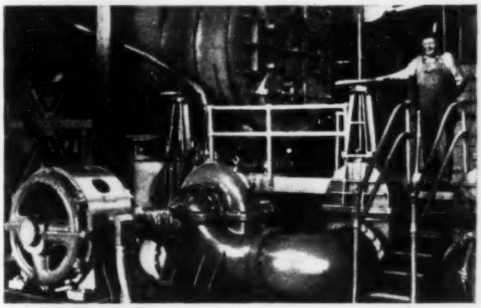
Strip is tempered (space not permitting illustration) on either a 48 or 56-inch temper mill . . . both of which are also Allis-Chalmers driven, supported and controlled. All electrical equipment for processing — including pickling, cleaning, tinning, and shearing — also is A-C supplied.

*Your* conversion or expansion program also can benefit from Allis-Chalmers wide experience in building and applying electrical equipment in the iron and steel industry. Integrated design and unit responsibility assure you of dependable performance. For more information, call the steel mill representative at your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3454



These two Allis-Chalmers 7500 kw condensing steam turbine generator units have been meeting the heavy power demand of the continuous hot strip mill at Granite City Steel Company for nearly 15 years.



At left above are the 8000 sq. ft. surface condenser, 11,300 gpm circulating water pump, and 150 hp induction motor — all Allis-Chalmers — serving one of the two 7500 kw steam turbines for the hot mill.

Regulex is an Allis-Chalmers trademark.

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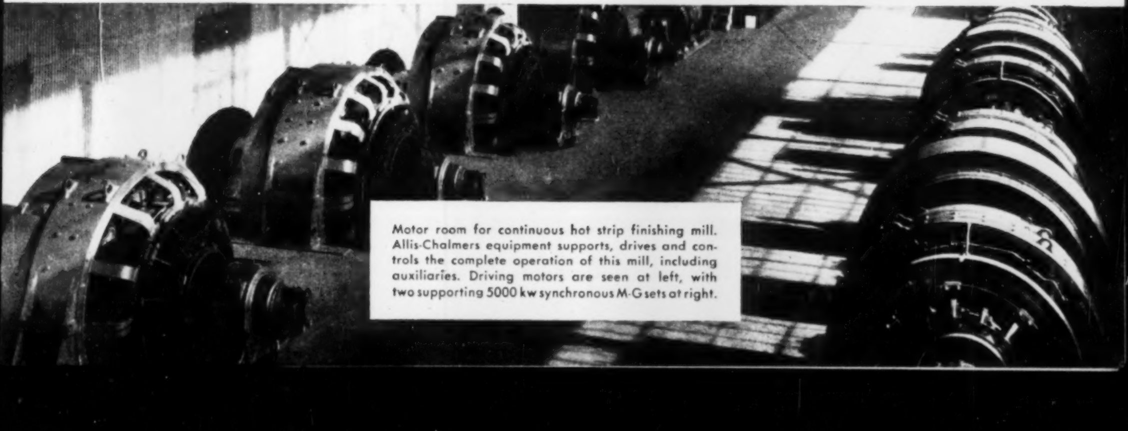
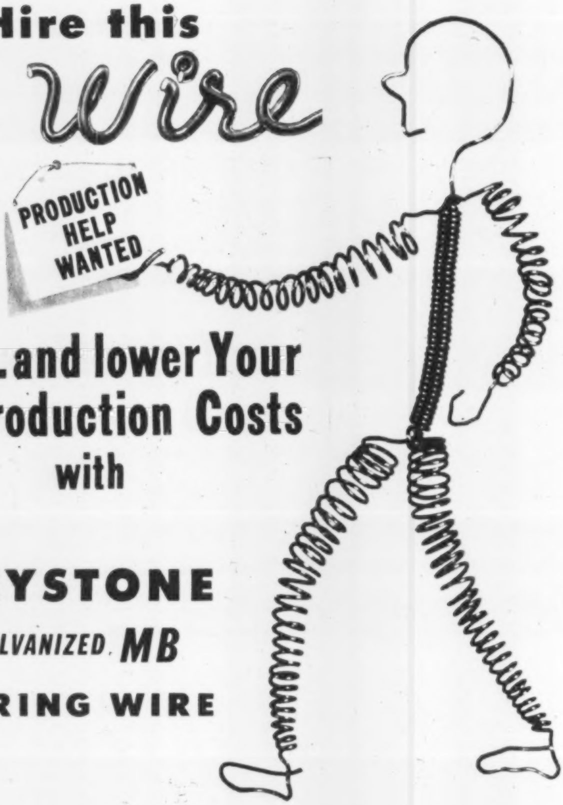


Motor room for continuous hot strip finishing mill. Allis-Chalmers equipment supports, drives and controls the complete operation of this mill, including auxiliaries. Driving motors are seen at left, with two supporting 5000 kw synchronous M-G sets at right.

**Hire this**



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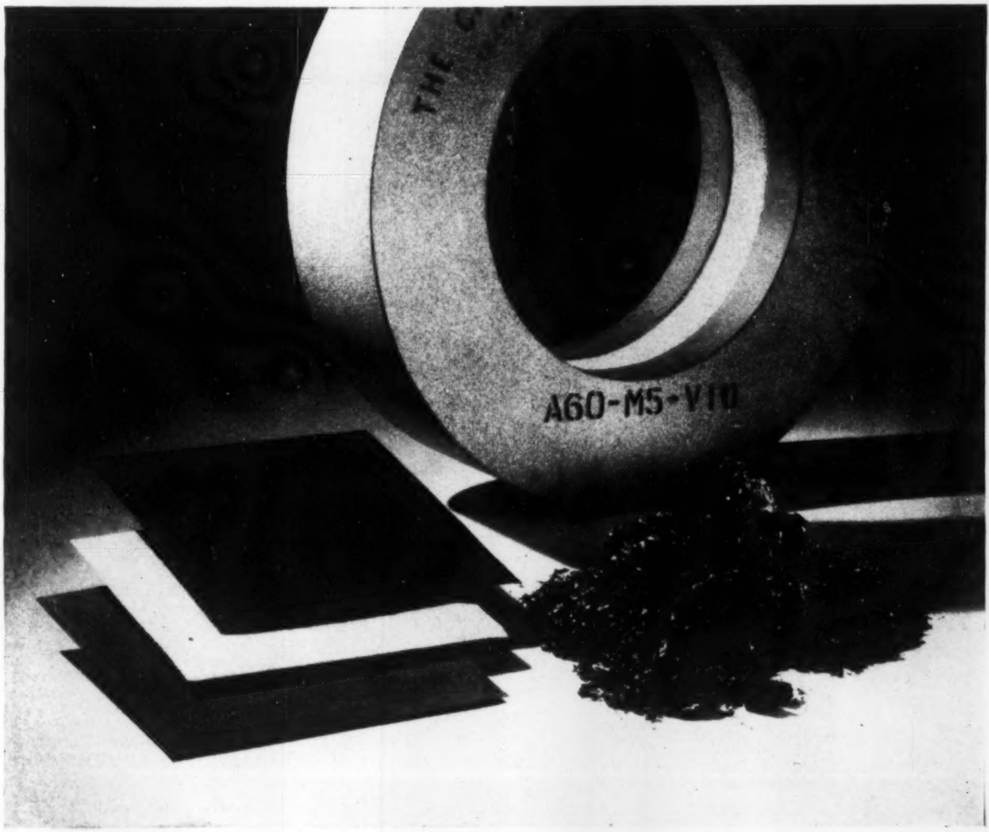


## A complete line for complete results

Do you know when you are realizing the best available efficiency in your abrasive methods? Chances are, you're getting close if you buy abrasives by CARBORUNDUM. A *complete* line of abrasive products makes it possible for experienced CARBORUNDUM salesmen and distributors to recommend, and for you to select, that single abrasive product that will give you *complete* results. With the right product, you know you're operating at top efficiency, getting the most out of your abrasive methods, saving expenses, producing better.

Best of all, if an improvement comes along that is even *more* efficient than the abrasive product you are using at present, chances are a CARBORUNDUM salesman or distributor will be the first to know and recommend it to you.

Are you sure you're getting *complete* results? Your CARBORUNDUM salesman or distributor can tell you. Or write Dept. S 80-27.

*Only* **CARBORUNDUM**
TRADE MARK

***makes ALL Abrasive Products . . . to give you the proper ONE***

*"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, N.Y.*

WHEELABRATOR®
airless blast cleaning
IDEAS
to improve production operations

As a versatile tool for cleaning, surface preparation and finishing operations, Wheelabrator airless blast equipment offers unique time-and-money-saving possibilities. Chances are excellent that it can profitably improve your production operations, like it has in the cases described below.

**Bonding Stone to Metal**

At Armstrong & White, Inc. Wheelabrating provides the uniform finish required for bonding abrasive grinding wheels to steel plates. They estimate a saving of $700.00 monthly over previous preparatory costs plus the elimination of a serious rust accumulation problem.

**Glass Coating Steel Bolts**

Steel bolts are uniformly etched by Wheelabrating to enable the glass coating to fuse into the metal at Sta-Rite Products, Inc. Benefits: No rejects due to imperfect cleaning; a $155.60 daily saving in bonding costs; working conditions improved.

BEFORE
AFTER
GLASS COATED

**Other Examples of Wheelabrator's Versatility**

Reducing porosity of die castings; Deflashing plastic molded parts; Removing flux and spatter from weldments; Surface preparation for galvanizing, plating, rubberizing, enameling; Improving deep drawing operations; Etching steel mill rolls; Removing mica from molded rubber.

The WHEELABRATOR Unit

WORLD'S LARGEST
BUILDERS OF AIRLESS
BLAST EQUIPMENT

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka 5, Indiana

# LETTERS
## TO THE EDITORS

### CMP: Too Much Theory?

I note with interest your item, "Steelmen Revolt on Full CMP," (STEEL, June 25, p. 39).

Under the guise of extreme emergency, the theorists in Washington would like to take control of all business . . . These idealists would feed these controls in small doses at first—a little at a time—eventually gobbling up the whole economy. They are only interested in fastening themselves to the public payroll, adding to the already excessive tax burden. CMP is not a necessity and should be thrown out.

Louis A. Theisen
Metal Products Corp
Weehawken, N. J

### The Metallurgical Congress

Many thanks for your article about the World Metallurgical Congress (STEEL, June 11, p. 76) . . . A mighty fine job and all of us greatly appreciate it.

W. H. Eisenman, secretary
American Society for Metals
[illegible]eland

This is to thank you for your issue featuring the World Metallurgical Congress, to be held in Detroit, Oct. 15-19. I note particularly the main editorial, "Cross Fertilization of Ideas," and the article by A. H. Allen, "First Exploratory Effort in World Metallurgy." I wish to compliment you on a very interesting issue of STEEL.

James Boyd, director
Bureau of Mines
United States Department of the Interior
Washington

Send two copies of your June 11 issue, which I want for the excellent portrait of my good friend, Dr. Zay Jeffries, on the cover. Your artist has done a remarkably good job . . .

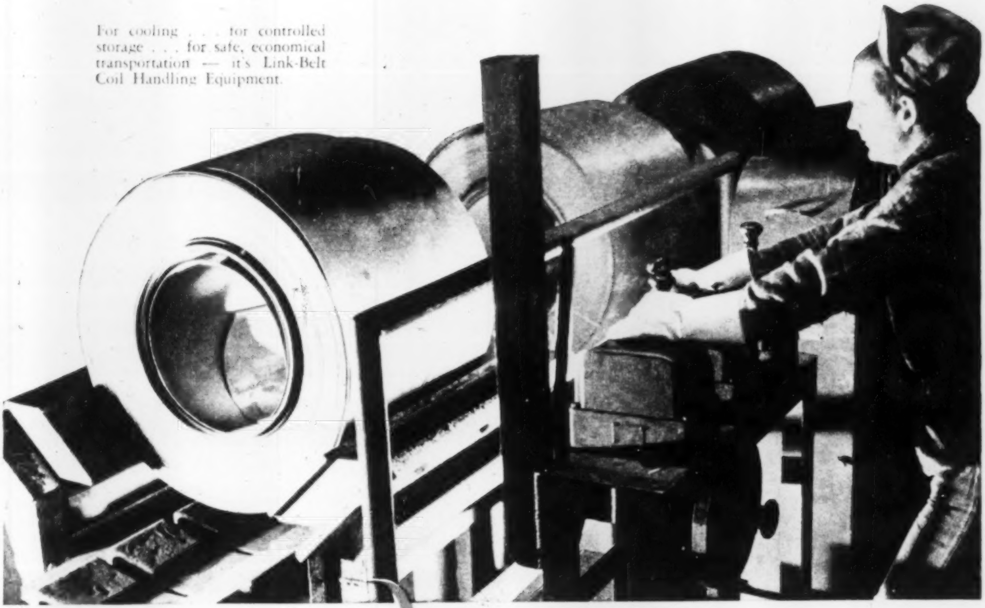
So much for the artist, but this man Allen; that's something else again. "Unprepossessing"—huh! He'd better hide under the bed until this thing blows over. Possibly in time, after he gets to know Dr. Jeffries better, and particularly if you buy him a dictionary, he may learn that unpretentious or unassuming would have been a happier and more fitting choice. When he finally realizes the enormity of his crime, I only hope he won't kick the office cat or fire the proof-reader, but rather finds surcease in some minor expiation such as jumping off the D & C dock . . .

L. S. Twomey
c/o Air Products Corp
Allentown, Pa

• *We have dispatched Reader Twomey two copies of the June 11 issue. Perhaps he will forward it on to the American Society for the Propagation of Semantics. Meanwhile we have consulted a dictionary and find the following definition of prepossess: To preoccupy (one), so as to preclude other ideas, beliefs, etc.; hence to bias, prejudice. By process of integration and negation, that would make our reference to the Doctor indicate a man who is unbiased, unprejudiced, open to conviction, seeking no special favors.*

LINK-BELT RESEARCH AND ENGINEERING WORK FOR INDUSTRY

For cooling . . . for controlled storage . . . for safe, economical transportation — it's Link-Belt Coil Handling Equipment.



# How LINK-BELT coil handling equipment helps America produce more steel

## LINK-BELT has worked hand-in-hand with the nation's steel mills for 50 years to increase yield, cut waste

Conveying systems, pioneered and engineered for the steel industry by Link-Belt, move giant 75,000 lb. coils . . . around corners, up and down inclines. Auxiliary devices transfer the coils from one conveyor to another . . . turn, weigh, lower or tilt them.

And all this is accomplished gently — no scuffing or peening of edges, no telescoping of coils. Yield is increased because of lower scrap losses. Safety is improved. Physical labor required by crews is reduced.

Just as Link-Belt has helped lick waste in steel mills — so throughout all industry, Link-Belt equipment is cutting the cost of processing, materials handling and power transmission. You, too, may confidently rely on Link-Belt.

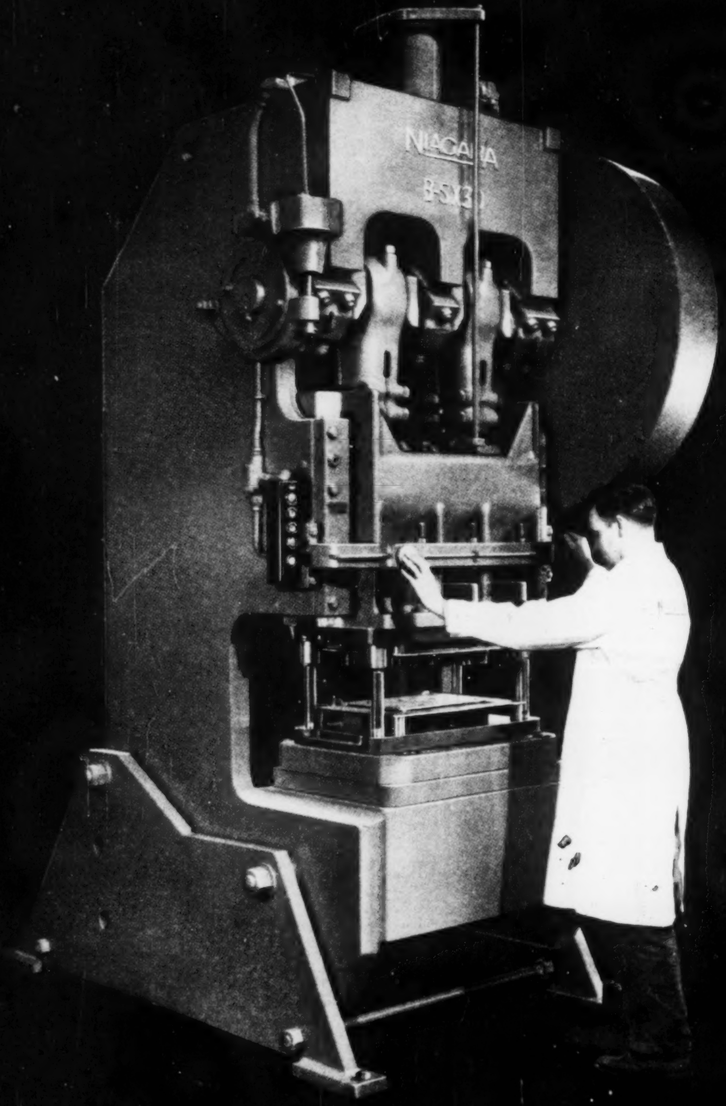
**LINK-BELT**

*World's Largest Manufacturer of Materials Handling and Power Transmission Equipment*

**LINK-BELT COMPANY:** Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

NIAGARA

for Defense Production



Niagara No. BI-5x30 Gap Frame Double Crank Inclinable Press fitted with magnetic perforating dies made by S. B. Whistler & Sons, Inc., Buffalo, N. Y.

Press equipped with air actuated electrically controlled sleeve clutch.

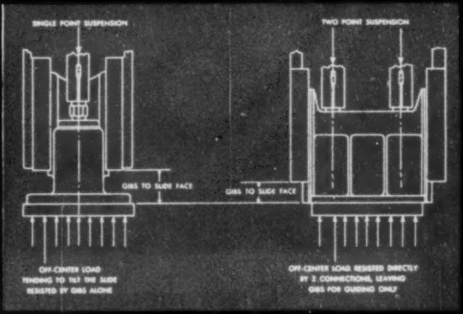
*Write for Specifications*

**NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.**

# PRESENTS The NEW

# No. BI-5x30 Double Crank Gap Frame Inclinable Press

## with one-piece welded steel frame


SINGLE POINT SUSPENSION
TWO POINT SUSPENSION
GIBS TO SLIDE FACE
GIBS TO SLIDE FACE
OFF-CENTER LOAD TENDING TO TILT THE SLIDE RESISTED BY GIBS ALONE
OFF-CENTER LOAD RESISTED DIRECTLY BY 2 CONNECTIONS, LEAVING GIBS FOR GUIDING ONLY

- Gives full support to wide dies, impossible to obtain on the conventional single point Inclinable Press even with slide flanged out.
- Gibbing may be brought closer to point of load application on this double crank press than with flanged slide single crank design.
- Two point suspension resists tendency of slide to tilt under off-center loading conditions.
- Niagara gap frame construction gives equal access to all four sides of die. No ribs or shafts extending across the back of press.
- Inclined position permits finished work to drop off the rear of the press.

- Gearing enclosed and running in oil.
- Backshaft mounted on anti-friction bearings.
- Air counterbalance for slide.
- Bronze bushed main and connection bearings.
- Niagara electrically controlled air actuated sleeve clutch.
- Air releasing brake.

Similar presses are made in sizes ranging from 3½" to 6½" diameter shaft. Sizes 3½" and 4" are made with mechanically operated sleeve clutch.

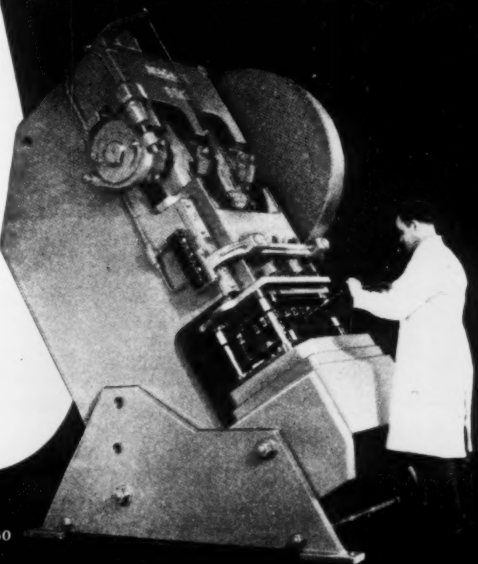


Illustration shows Niagara No. BI-5x30 press in inclined position.

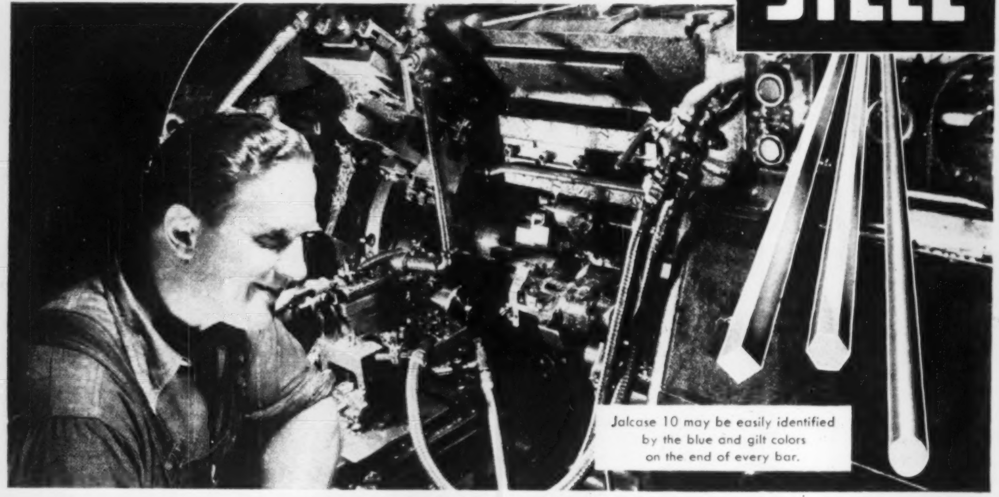
*Manufacturers of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work*

**DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK**

# JALCASE 10 HELPS YOU

## . . . eliminate a production step
## . . . machine better cold-finished parts

**J&L STEEL**



Jalcase 10 may be easily identified by the blue and gilt colors on the end of every bar.

*Check these advantages of* **JALCASE 10** *that offer you faster, more economical operations . . .*

### NO HEAT-TREATING OF FINISHED PARTS REQUIRED

Many times finished part specifications on a job call for a high degree of hardness, but not as high as that obtained through heat-treating the finished part. In these applications, parts manufacturers and machinists have found it profitable to use Jalcase 10 and eliminate heat-treating altogether.

### MINIMUM DISTORTION

Although Jalcase 10 is a high-carbon steel, distortion is cut to a minimum through special treatment during the cold-finishing process. As a result, when mechanical properties must be as high as possible and distortion held to a minimum, Jalcase 10 fulfills these rigid requirements.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL
YOU CAN HELP!

### HIGH MECHANICAL PROPERTIES

Jalcase 10 (A.I.S.I. No. C-1144) has the following cold-finished properties:

| | |
|---|---|
| Minimum Tensile Strength | 115,000 lb/sq. in. |
| Minimum Yield Strength | 100,000 lb/sq. in. |
| Elongation in 2 inches | 7% (minimum) |
| Reduction of area | 20 %(minimum) |
| Brinell Hardness Range | 235—285 |

***PLUS***. . . all the other advantages Jalcase steels have over ordinary screw stock:

1. lower cost per unit produced
2. finer finish on completed pieces
3. longer machine-tool life
4. less screw-machine down-time

### WANT MORE INFORMATION?

Send for our FREE booklet entitled "You Can Make Them Better with Cold-finished Jalcase." This illustrated booklet gives you complete technical information about *all ten* grades of Jalcase and how they can help you get better results in your machining operations. WRITE TODAY!

You can make them better with cold-finished
JALCASE
J&L STEEL

**JONES & LAUGHLIN STEEL CORPORATION**
**404 JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA**

J. W. Lovely

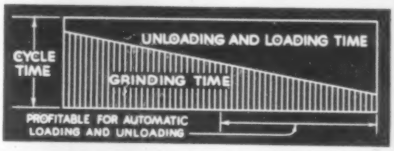
*What's in Vermont this month?**

## AUTOMATIC LOADER CAN DOUBLE PRODUCTION AND HALVE COSTS

A manufacturer recently had the problem of increasing his internal grinding production without purchasing another machine. A study showed that a reduction of loading and unloading time was the only answer.

Bryant engineers specified an automatic loader and ejector, timed to unload as the diamond was dressing the wheel for the next work cycle. Production was increased from 160 pieces per hour to 320 per hour, and, at the same time, the operator was relieved of his major duties. Costs were cut in half.

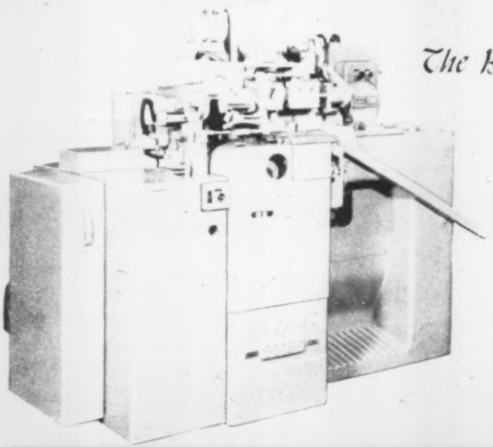
Bryant Chucking Grinder Company is prepared to give you accurate figures on production and costs so that your management can translate them into terms of investment. Send your present production figures to Bryant now. We will give you data which may help you get that new automatic machine.


UNLOADING AND LOADING TIME
CYCLE TIME
GRINDING TIME
PROFITABLE FOR AUTOMATIC LOADING AND UNLOADING

* Remember . . . it won't cost to inquire!

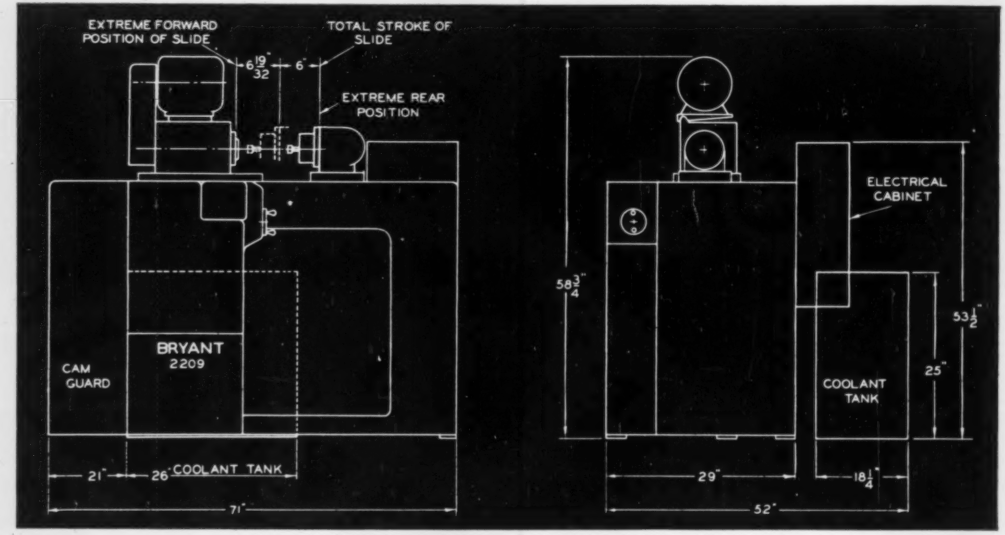
*Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.*

## FOR HOLE GRINDING

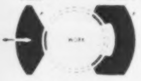


### *The Bryant 2209-D Precision Hole Grinder*

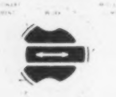
This machine is designed particularly for high production, precision grinding of bores from $\frac{1}{4}$" to 3" in ball bearing races, gears, rolls, bushings, etc. The entire cycle mechanism is a combination of cam and lever. The cycle is fully automatic as follows: load, rough grind, true wheel, finish grind, and unload. Automatic loading allows a single operator to handle a large battery of machines — his duties consisting only of loading hoppers and changing wheels. Wheel speeds up to 100,000 R.P.M. are obtained with the Bryant Hi-frequency wheelhead. Write for folder.


EXTREME FORWARD POSITION OF SLIDE
TOTAL STROKE OF SLIDE
6 19/32"
6"
EXTREME REAR POSITION
CAM GUARD
BRYANT 2209
21"
26"
COOLANT TANK
71"
58 3/4"
ELECTRICAL CABINET
53 1/2"
25"
COOLANT TANK
29"
18 1/4"
52"

## FOR QUANTITATIVE READING OF THREAD FIT


MOVABLE SEGMENT
STATIONARY SEGMENTS
WORK

EXTERNAL


STATIONARY SEGMENT
WORK
MOVABLE SEGMENT

INTERNAL

### *The Bryant Thread Gage*

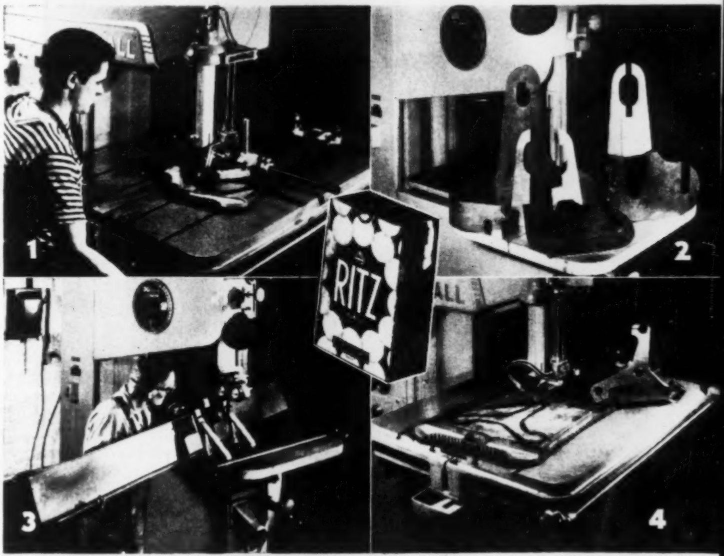
The Bryant Thread Gage gives an accumulated reading, on a dial indicator, of P.D., form and lead — a definite indication of assemblability. Drawings at left show the Bryant principle of an "expanding" master plug for checking internal parts, and a "contracting" master ring for checking external threads. The threaded part is dropped between (or over) the segments, operating lever is released, segment contact is made on all the threads, a partial turn of the part inspects the thread all over. *The Bryant gage is a truer tester than plug or ring testing.* Write for folder.

No. 11 Gage

## *Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.*

# HOW NABISCO BENEFITS FROM DoALL BAND MACHINING

**DOES WORK FASTER; CUTS ALL KINDS OF SHAPES; MACHINES BRASS, BRONZE, ALUMINUM, CAST IRON, STAINLESS, HARD TOOL STEEL; GETS FINER, MORE ACCURATE CUTS**



1. Circular parts cut automatically using disc cutting attachment and hydraulic power feed.
2. Sheet steel parts for packaging machinery produced quicker by friction sawing.
3. Friction sawing steel channel on DoALL Zephyr Band Machine.
4. Contour sawing irregular shapes from solid steel 2" thick by 14" square.

AT National Biscuit Company's machine shop in Evanston, Illinois, DoALL Band Machines really earn their keep. They work all the time on all kinds of jobs. They cut any material—even the hardest steel. One job originally calculated to take a week's time was done in three days on the DoALL MP-20. Other work formerly done on milling machines is now done much faster at less cost on DoALL's.

You can have benefits like these. Ask to have a FREE DEMONSTRATION of a DoALL Band Machine in your own plant. Call your local DoALL Sales-Service Store or write:

**THE DoALL COMPANY • 254 N. Laurel Ave. • Des Plaines, Illinois**

**SEND FOR CATALOG**

*Learn about jobs that DoALL Band Machining can do for you. Find out about blades for cutting every material; how you can saw, grind, hone, polish, friction saw — cut any shape. Write today.*

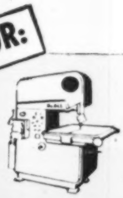
8-2

INDUSTRY'S NEW TOOLS

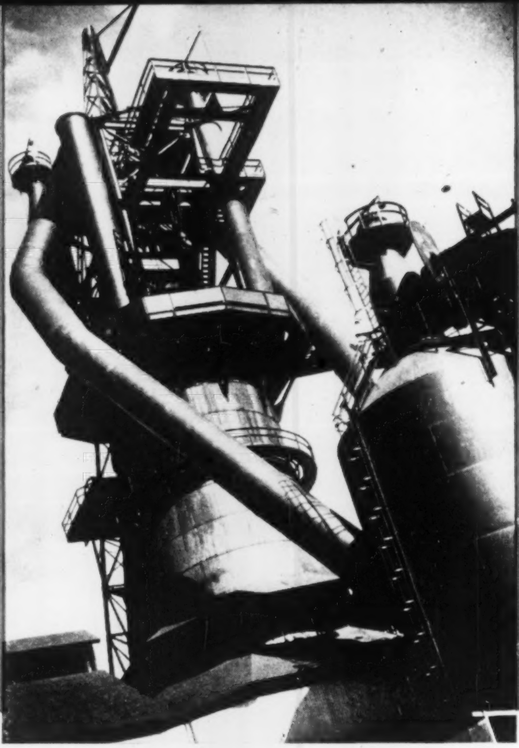
**DoALL**

27 SALES-SERVICE STORES

**CALL DoALL FOR:**



*Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies*



• • • • The world knows of America's fabulous steel production. It knows that our capacity to fashion the weapons of war is a fearsome thing.

And we know that steel has contributed more than any other industry to our daily lives. Everything we use . . . from toothbrushes to neckties . . . starts with steel.

The development of better refractories for every step in steel . . . and tremendous advances in production . . . have helped largely to make possible steel's progress. General Refractories is proud of its part.

# Hot Air That Talks Sense

GENERAL REFRACTORIES

**GENERAL REFRACTORIES COMPANY**
PHILADELPHIA

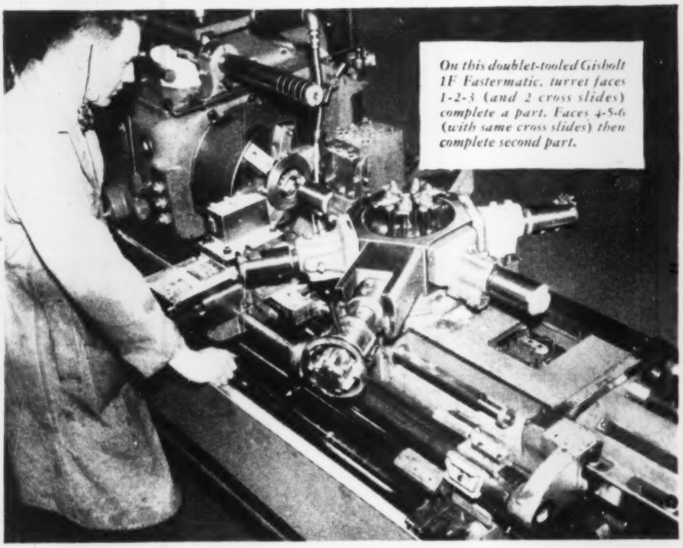
General's OLIVE HILL fireclay brick lines this blast furnace. And elsewhere in the plant you'll find General Refractories silica brick, basic brick, plastics, castables and bulk products. There's scarcely a heat application for which General does not supply a refractory.

General's extensive research facilities and modern production methods . . . General's 43 mines, 29 plants, 18 sales offices and 200 distributing agencies . . . are at your service. If you have a refractory problem, depend on the company that offers a complete refractories service.

**A Complete Refractories Service**

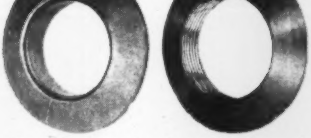
●

# HOW DUPLICATE TOOLING... AND A FASTERMATIC...



*On this doublet-tooled Gisholt 1F Fastermatic, turret faces 1-2-3 (and 2 cross slides) complete a part. Faces 4-5-6 (with same cross slides) then complete second part.*

# doubled production!

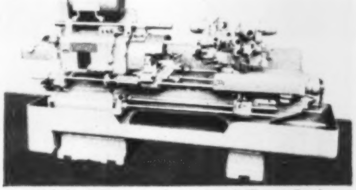


*Floor-to-floor time for these pulley flanges is down to 1.75 minutes. Duplicate tools and collapsing taps on the turret rough and finish the bore, chamfer and cut threads. Front and rear slides shave the angle and form the radius on the O.D.*

The time *and unit cost* for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that *two* parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts.



*Gisholt 1F Fastermatic Automatic Turret Lathe*

**GISHOLT MACHINE COMPANY**
*Madison 10, Wisconsin*

**THE GISHOLT ROUND TABLE**
*represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

**TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES**

# Cold Drawing at American Brass with Aetna-Standard equipment

DRAWBENCHES

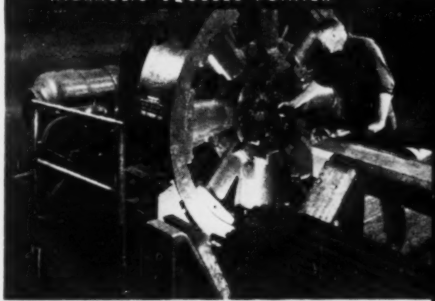
• Close-up of a triple draw Aetna-Standard Bench at The American Brass Company, Kenosha, Wisc.

• Improving plant facilities and equipment is a continuing program of The American Brass Company, manufacturers of Anaconda Brass and Copper Products. In conjunction with this program, Aetna-Standard has been one of the suppliers. The engineers of both companies cooperate closely in choosing the proper equipment. These installation views of Kenosha, Wisc., are typical of the over-all American Brass program.

Aetna-Standard makes equipment for all phases of Tube Drawing, from billet to finished tube. In addition to the three products illustrated here, Aetna recently introduced a Horizontal Bull Block.

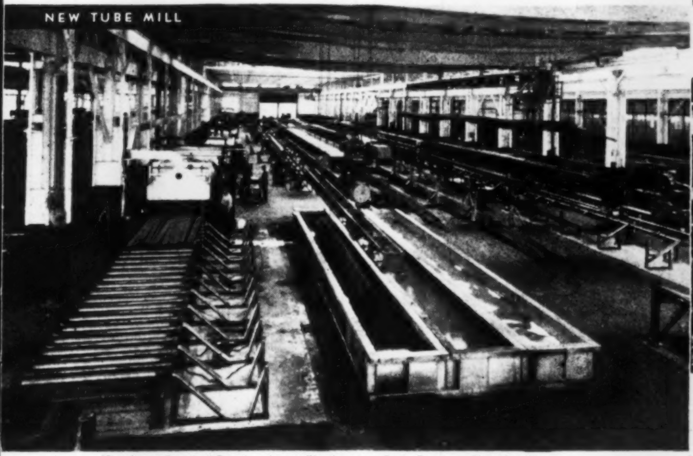
**Aetna-Standard has specialists in all phases of cold drawing. Call on these tubing and cold draw specialists for assistance in designing and building proper equipment for your requirements.**

HYDRAULIC SQUEEZE POINTER



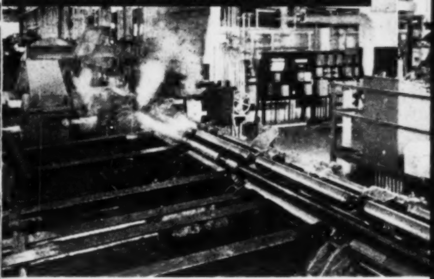
• A 600-ton Hydraulic Squeeze Pointer in the Kenosha, Wisc., plant of The American Brass Company. This firm also installed a 300-ton Aetna-Standard Squeeze Pointer.

NEW TUBE MILL



• Ten Aetna-Standard Drawbenches at The American Brass Company, Kenosha, Wisc. They include (3) 100,000 lb.; (3) 36,800 lb.; and (4) 12,000 lb. benches.

TUBE BILLET PIERCING MACHINE



• The Aetna-Standard 19" Piercing Mill at The American Brass Company, Kenosha, Wisc.

ASSOCIATED COMPANIES

**Head Wrightson Machine Company, Ltd., Middlesbrough, England**—Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.

**Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.**

**M. Castellvi, Inc., New York, N. Y.**—Mexico, Central and South America.

**Societe de Constructions de Montbard, Paris, France**—France, Belgium, Holland, Luxembourg, Switzerland.

**Compagnia Italiana Forme Acciaio, Milano, Italy**—Italy.

**Aetna-Japan Company, Ltd., Tokyo, Japan**—Japan.

**Hale & Kullgren, Inc., Akron, Ohio**—Representative for the Rubber Industry.

*Designers and Builders to the Ferrous, Non-Ferrous, Leather and Rubber Industries*

**aetna-standard**

**THE AETNA-STANDARD ENGINEERING COMPANY · YOUNGSTOWN, OHIO**

**Plants in Warren, Ohio · Ellwood City, Pennsylvania**

Keep SCRAP on the move!

Idle scrap does nobody Good!

**Superior Steel**
CORPORATION
CARNEGIE, PENNSYLVANIA

# UPS PRODUCTION 25% BETWEEN DIE GRINDS

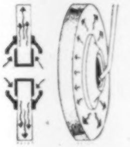
## DoALL "COOL-GRINDING"

(U.S. PATENT NO. 2470350)

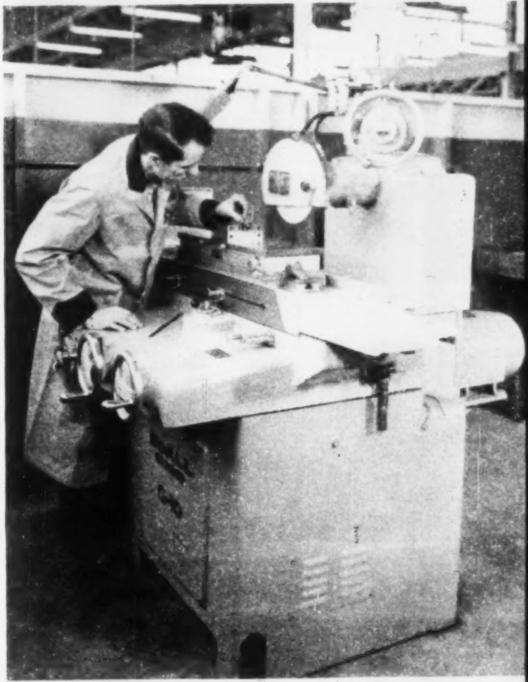
## GIVES IMPROVED FINISH ON HIGH CARBON HIGH CHROME NN STEEL

◆

**"COOL-GRINDING" WILL PREVENT BURNED OR SCORED FINISH, LENGTHENS THE LIFE OF YOUR TOOLS**



"Cool-Grinding" takes liquid in at the hub of the wheel, and through centrifugal force passes it through the pores of the wheel and out as a fine mist *at the point of contact between the wheel and the work.*



ONWARD Manufacturing Company, Ltd., Kitchener, Ont., knows the benefits of DoALL *"Cool-Grinding."* They say, *"Since using this Grinder with "Cool-Grinding" we have obtained a 25% increase in number of pieces per die grind over former methods of grinding."*

WHY? Because DoALL "Cool-Grinding," with coolant flowing *through* the wheel, prevents excessive heat that scores, draws the temper or checks the metal finish. The finish is smoother, too. The die does more work before it needs grinding. You save time and money and material. Ask to have a Free DEMONSTRATION of DoALL "Cool-Grinding" at your own plant. Call your local DoALL Sales-Service Store or write:

**SEND FOR CATALOG *Today***

*—see how "Cool-Grinding" works, why it is better, how it will benefit you —see the different models of DoALL Precision Grinders for toolroom or production work.*

**INDUSTRY'S NEW TOOLS**

**THE DoALL COMPANY · 254 N. LAUREL AVE. · DES PLAINES, ILL.**

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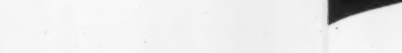

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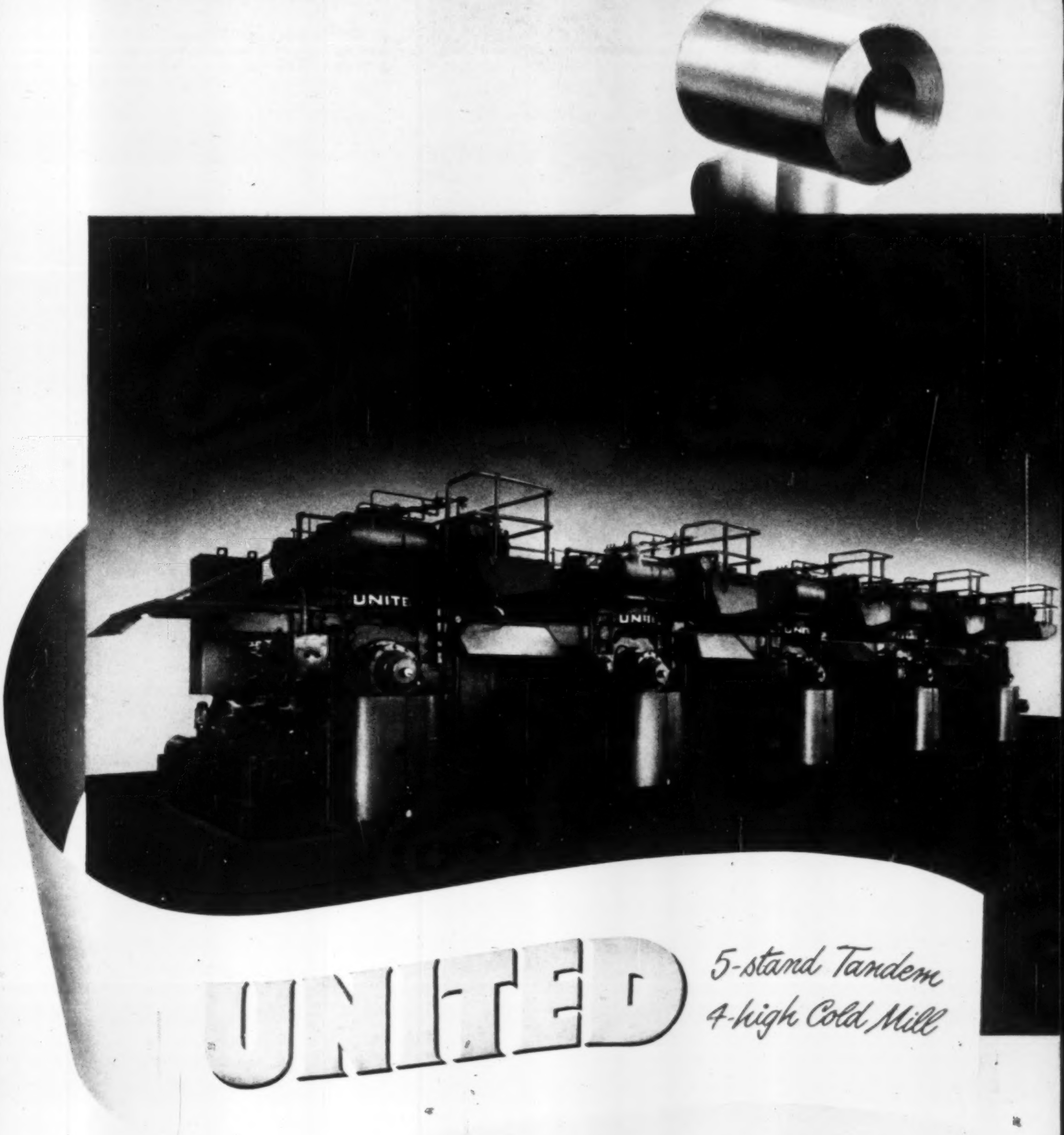

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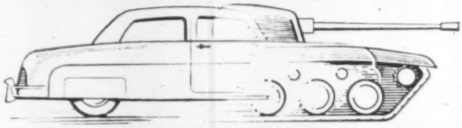

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# Buy Alloys on Hardenability

The defense program requires conservation of strategic metals—so, as in the last war, alloy steel analyses are changing. Some standard alloys are still available. But many new, or interim, analyses are already on the market. Others are on the way.

Today more than ever, under these changing conditions, the safest way to buy alloys is on the basis of analysis *and* hardenability rather than on analysis alone. When we know the hardness or tensile strength you need, we make absolutely sure that the alloy you receive meets your requirements—even though it will be many months before standard hardenability ranges of the new steels are established. Here is how we do it:

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Not every company makes these tests, records this information, but Ryerson does—and at no extra cost to you. It's all part of a service system called the Ryerson Certified Steel Plan. So during this confusing period, order by AISI and SAE number if you wish but also specify hardenability and be doubly sure. Though some shortages are inevitable, we will do our level best to supply the alloy steel you need.

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**STEEL** -

# The Metalworking Outlook

*July 23, 1951*

## A Problem in Subtraction

CMP officials have fingers crossed on their answer to a problem in arithmetic. They want to give makers of automobiles, refrigerators and other civilian hard goods 15 per cent of the total steel supply in the last four months of the year. That's how much they hope will be left over after defense and defense-support industries are taken care of. In the inevitable confusion attending the start of CMP, it now appears that perhaps 15 per cent won't be available. A good bet: The government estimate of 15 per cent will ultimately prove to be fairly accurate.

## No Cutbacks for Warehouses

If you buy steel from warehouses, you can count on about the same treatment for the rest of the year that you have been getting thus far. A CMP order to replace the old NPA Order M-6 for warehouses contemplates no decrease in steel for the distributors, except for products coated with zinc. Under M-6 distributors of steel products are guaranteed a minimum of 85 per cent of their average monthly shipments of steel during the base period, Jan. 1 to Sept. 30, 1950. NPA is considering changing that to a basis of a product group percentage.

## No Change in Policy

The NPA switch on construction applications is merely a matter of paperwork, and won't involve any change in policy toward action on such applications. The agency is merely shifting the setup so that construction will come under CMP. Now, you have to fill out a new form, CMP-4c, that will serve both as a construction application and as an application for allotment of steel, copper and aluminum on types of construction for which allotments will be made.

## Look Before You Leap

So you want to buy or build a new plant? Look before you leap, advises the Society of Industrial Realtors. Water, freight rates and state taxes are among the major factors that should influence plant location, says the society. In locating a factory, be sure that there's not the danger of too much water, as well as too little. Study rail, road and water freight rates for local quirks that might endanger your competitive position. Give minute attention to the state's industrial taxing policies, not only to existing rates but to future taxing trends, also.

## Troubles in Natural Gas

Petroleum Administration for Defense stirred up a hornet's nest with its proposed ban on the use of natural gas. The basic problem is: Enough gas, not enough steel to process and pipe it. PAD says it needs about 2,385,000 tons of steel for installations of facilities during the fourth quarter of 1951. It was asked to cut that down and did

*Production-Engineering News—p. 65*   *The Market Outlook—p. 107*

so by 250,000 tons, to 2,135,000. Fourth quarter allocations aren't out yet, but PAD expects to do little better than in this, the third quarter when it's getting 1,593,000 tons. With that prospect, PAD will stick by its guns in proposals to limit the expansion of natural gas distribution.

## Where War Contracts Go

Expect a good deal of furor but little concrete action to result from the Senate Small Business Committee's findings that ten companies have received 40 per cent of the dollar volume of defense orders. In World War II ten firms controlled 30 per cent of the war contract dollar volume. Top is General Motors Corp. with $3.5 billion. Second is Ford Motor Co. with $1 billion (p. 43). The remaining eight are all producers of airplanes or airplane parts. Little can come from the disclosures because only the large companies can handle many of the big war contracts. The 40 per cent figure is also misleading because much of that 40 per cent eventually goes to smaller companies in subcontracts.

## Wildcat Strikes Increase

Metalworking is plagued by a little noted but nevertheless serious wave of wildcat strikes. Wildcatters walked out for two days at Sharon Steel Corp., and lost 5000 tons of ingot steel production. Auto assemblers and suppliers have been hit by an almost constant series of petty disturbances, the most exasperating at Hudson Motor Car Co. which has had intermittent stoppages for weeks. We always have some wildcat troubles, but the present spell is one of the worst on record.

## Civilian Tool Deliveries Lag

Deliveries are slowing on machine tools for nondefense projects, particularly in the automotive industry. Ford has not received delivery on 22 per cent of such tools ordered in 1950. Of tools ordered by Ford in the first quarter of 1950, which should have been completed by now, 29 per cent are not expected before the first quarter of 1952 or later.

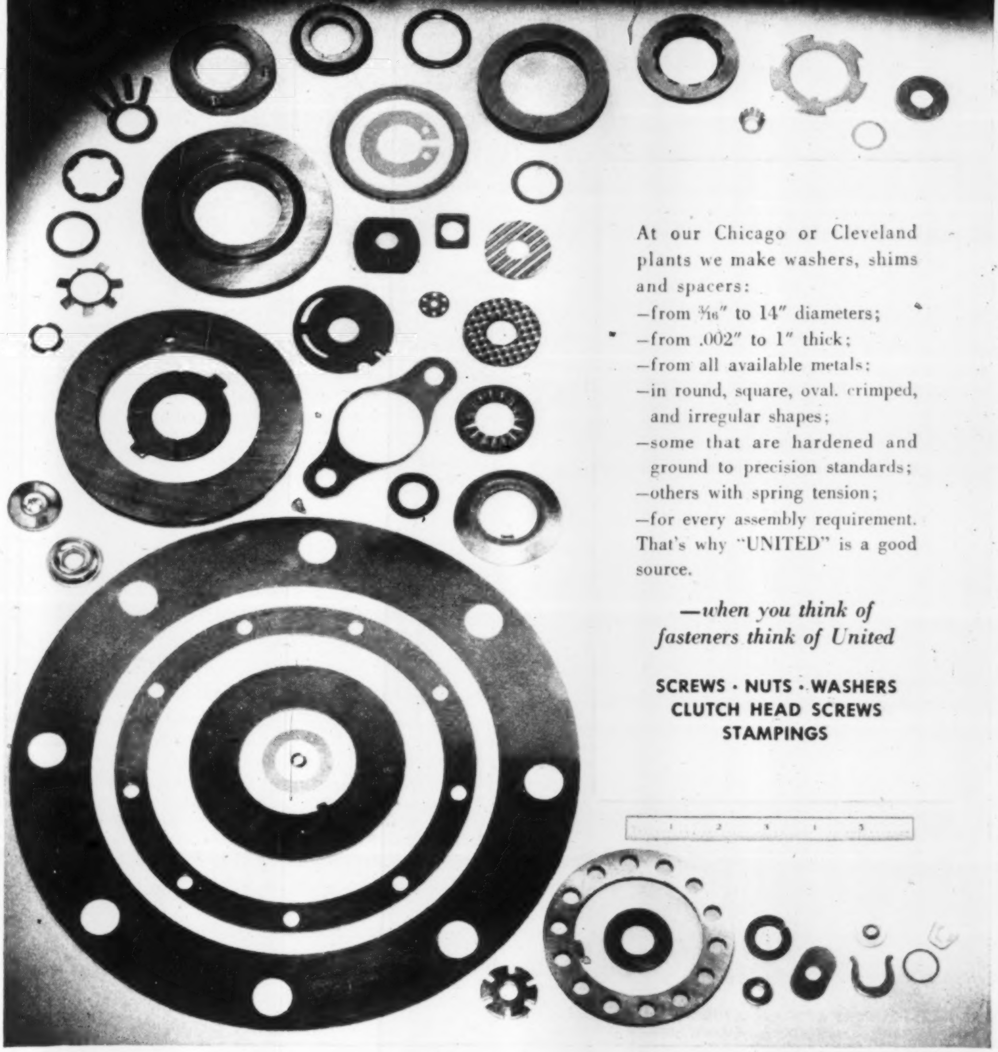
## Straws in the Wind

Passenger car makers want to be covered by CPR 30, the machinery pricing order, in place of the present CPR 1 . . . The screw machine products industry is plugging for a ceiling price regulation designed especially for it . . . A long-term $2.5 million contract to build large naval aviation rocket motors has been awarded by the Navy to York Corp.

## What Industry Is Doing

Gathering scrap today can pay big dividends tomorrow in providing more steel (p. 37) . . . Original auto parts makers fear a rough ride ahead (p. 39) . . . U.S. Spring & Bumper Co. has worked out a chromium-molybdenum-vanadium alloy steel (p. 40) . . . The U.S. policy of hiring industry men without compensation is again attacked (p. 41).

# UNITED
## WASHERS
## SHIMS AND SPACERS



At our Chicago or Cleveland plants we make washers, shims and spacers:

—from 3/16" to 14" diameters;
—from .002" to 1" thick;
—from all available metals;
—in round, square, oval, crimped, and irregular shapes;
—some that are hardened and ground to precision standards;
—others with spring tension;
—for every assembly requirement.

That's why "UNITED" is a good source.

*—when you think of fasteners think of United*

**SCREWS · NUTS · WASHERS**
**CLUTCH HEAD SCREWS**
**STAMPINGS**

## United Screw and Bolt Corporation

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# INTRICATE LARGE CASTINGS ...readily produced in DUCTILE IRON

**DUCTILE IRON** is a cast ferrous product that combines the *process advantages* of cast iron with many of the *product advantages* of cast steel.

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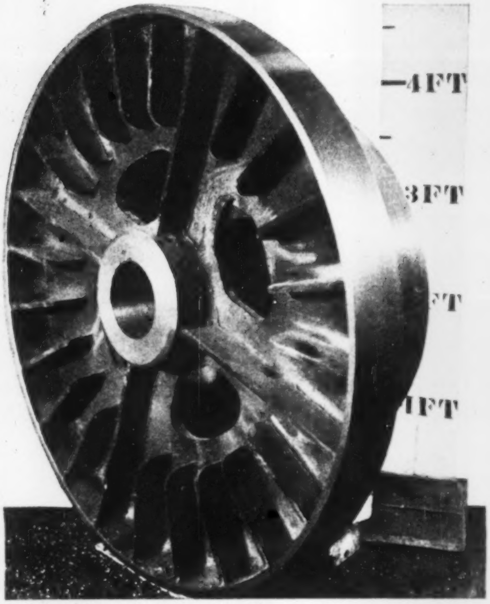
Typical current applications include chemical pots, compressor shells, cylinders for hydraulic presses, fly wheels, housing for electric power driven tools, large gears for coal mine equipment, vise jaws, and many other parts.

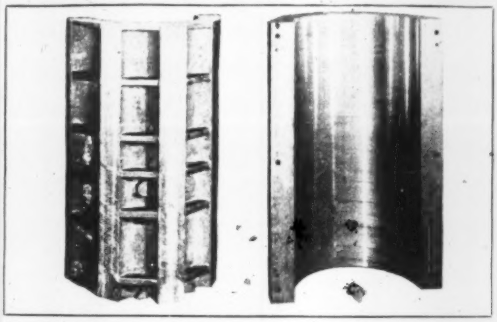
### AVAILABILITY

Send us details of your prospective uses, so that we may suggest a source of supply from some 100 authorized foundries now producing ductile iron under patent licenses. Request a list of available publications on ductile iron...mail the coupon now.

**ST. PAUL FOUNDRY & MANUFACTURING CO.**, St. Paul 3, Minn., cast this hydraulic head for a billet conditioner in ductile iron having 92,000 p.s.i. tensile strength, 67,000 p.s.i. yield point and 7.8% elongation.



**STAVER FOUNDRY COMPANY**, Virginia, Minn., produced this large hoist drum in ductile iron to meet requirements of toughness with strength, and wear resistance with good machinability.



**PYOTT FOUNDRY & MACHINE CO.**, Chicago 7, Ill., produced these ductile iron castings for dies for forming 24″ to 36″ diameter pipe from steel plate of ¼″ to ½″ thicknesses. The finished tooling was done by the Vernon Allsteel Press Co. of Chicago. The dies are to be used in large presses that exert 18,000 tons pressure.

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## THE INTERNATIONAL NICKEL COMPANY, INC.

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# Too Much Power

Survey Research Center of the University of Michigan has announced results of a study of the attitude of the American people toward "big business." One question asked by interviewers had to do with things which "big business" does that are good or bad for the country as a whole. Of the persons interviewed, 76 per cent believe the good things outweigh the bad things, 10 per cent think the bad outweigh the good, 2 per cent say the good and bad are equal and 12 per cent have no opinion.

Probably this is as favorable an attitude as "big business" can expect under present conditions. However, it may be profitable to explore the type of "bad things" which the critics charge against "big business." The two major ones are described as "too much power over small businesses" and "too much power in other areas."

Another insight into this "too much power" complex is found in answers pertaining to the influence wielded upon national affairs by five institutions, namely, state governments, big businesses, labor unions, businesses that are not big and the national government. Persons interviewed were asked to rate these five in the order of their present "influence upon how things go in this country." The replies brought forth this rating: 1. National government, 2. labor unions, 3. big businesses, 4. state governments, 5. businesses that are not big.

Then respondents were asked to rate the five in the order in which they would like to see them influence how things go in this country. From the replies it is apparent a majority would like to see the influence of the national government, state governments and small businesses increased and that of big businesses and labor unions reduced. With these changes, the ranking would be: 1. National government, 2. state governments, 3. big businesses, 4. labor unions, 5. businesses that are not big.

From these returns it would seem that the people think government must be stronger to exercise proper restraints upon business and unions. One wonders whether or not the people are aware of the danger of too much power in government.

E. L. Shaner

EDITOR-IN-CHIEF

**STUDIED RUTHLESSNESS:** To keep steel mills and foundries operating at capacity, it will be necessary to obtain 36 million tons of purchased iron and steel scrap in 1951. This is almost 7 million more tons of purchased scrap than was consumed in 1950.

Experts say this tonnage can be procured if everybody will work hard to get it out. It will come chiefly from dormant industrial scrap, automobile graveyards, government installations, Asiatic battlefields, American farms and shipbreaking.

The challenge of scrap to executives in the metalworking industries is two-fold: 1. Return production scrap promptly. 2. Get out every available ton of dormant scrap. An important part of this No. 2 job is to delegate to the scrap committee enough authority to enable it to scrap obsolete and useless stuff which department heads have retained for years on the slim chance that "it might come in handy some day." A certain amount of calculated ruthlessness will work wonders in the coming scrap drives. —p. 37

* * *

**ACCENT ON BALANCE:** Sen. Blair Moody's Senate subcommittee's hearings in Detroit on the allocation of steel have revealed some enlightening testimony as to how shortages in one material can develop surpluses in another. Purchasing vice president of Ford Motor testified that when copper cut-backs were issued by the government, Ford found itself with too much steel. It sold 32,000 tons to suppliers at going market prices and later sold another 25,000 tons when NPA order M-47 forced a reduction in assemblies in the second quarter.

This experience probably is typical. Any company using critical materials in volume is at the mercy of the material in shortest supply. It can develop sudden surpluses in other materials. Disposal of these surpluses introduces another questionable factor into the problem of determining just where the steel appearing in gray markets originates. —p. 38

**MORE SUBCONTRACTS:** Because the timing and techniques of the current defense program in the aircraft industry differ radically from those prevailing during World War II, the role of subcontractors has been altered appreciably. Back in the forties, subcontracting was regarded by some prime contractors as a necessary evil—often more of a hindrance than a help. Today, with a more leisurely scheduled program and the complexities of jet power and electronics in transonic planes, the desirability of broadening the base is more pronounced.

This spells opportunity for many small companies. Right now there are 61,251 aircraft subcontractors and the number is likely to increase considerably inasmuch as the peak of aircraft production will not be reached until next year. To date about 50 per cent of the dollar value of Air Force and Navy contracts has gone to suppliers. There is a fair chance that this percentage may be upped as the defense program gains momentum. —p. 48

* * *

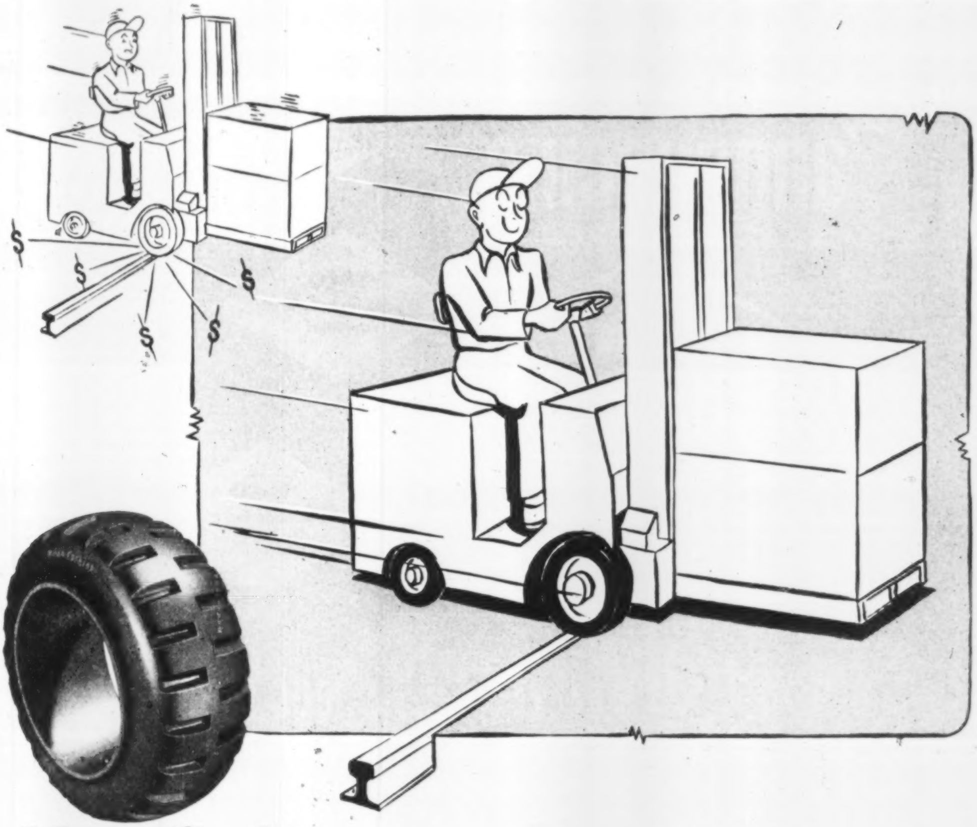
**DECIMALS FOR GAGES:** Many persons in the metalworking industry will remember that on many occasions during the past several decades, individuals and organizations have proposed that the nation's standards of measures be changed. Ford Motor Co. has taken the initiative in this direction by adopting the standard decimal system in place of the conventional gage numbers when specifying the thickness of steel. For instance, body panel sheet now known as 20-gage sheet henceforth will be referred to as 0.036-inch sheet. Ford engineers expect to extend the decimal system to brass, copper, aluminum and other metal sheet and strip.

D. G. Davis, director of manufacturing engineering of Ford, believes that decimal measurements will permit easier scheduling, reduced bookkeeping and inventories, more effective use of trimmings and lower materials handling costs. It is likely the Ford action will encourage others to follow suit. This would be gratifying in view of the rapid drift toward precision manufacturing. —p. 52

* * *

**WORKHORSE OF ARMY:** General Motors' new 6-wheel drive military truck, with automatic transmission and eight forward and two reverse speeds, must be a marvel of simplicity from the standpoint of the driver. Howard Tuttle, Detroit editor, boasts that with less than ten minutes of instruction, he was qualified to guide the truck over roads in General Motors' proving ground over which he wouldn't and probably couldn't, drive his own car.

Improvement in military vehicles is tremendously important. In modern warfare the ability to move personnel and equipment over rough terrain frequently is a decisive factor. Our vehicles have been recognized as "tops" all over the world, a fact that is attested by the almost universal use of American models by allies and enemies alike whenever they can get them by purchase, loan or capture. Improving our already superior vehicles is a laudable objective. —p. 51



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TI-CO is a continuously annealed and galvanized sheet steel manufactured by Inland under the patented Sendzimir process.

In TI-CO galvanized sheets, the brittle iron-zinc layer found in ordinary galvanized sheets is virtually eliminated. This means the zinc coating adheres so tightly to the steel that TI-CO sheets can be severely formed without the flaking or peeling of the coating. Stamping, cold-drawing, double-seaming and brake or roll-forming will not impair the protective qualities of TI-CO.

This special process of manufacture gives TI-CO a bright, uniform finish that sets it apart from ordinary galvanized sheets.

Unfortunately, the present restrictions and shortage of zinc mean that today's production of Inland TI-CO must be limited to use by our regular galvanized sheet customers and other galvanized sheet users having Government rated orders. However, toward the day when it will be in abundance for all, we present these facts. So keep TI-CO in mind for use in the future—for applications where the corrosion-resistant qualities of a zinc-coating can be effectively combined with the excellent forming qualities of TI-CO.

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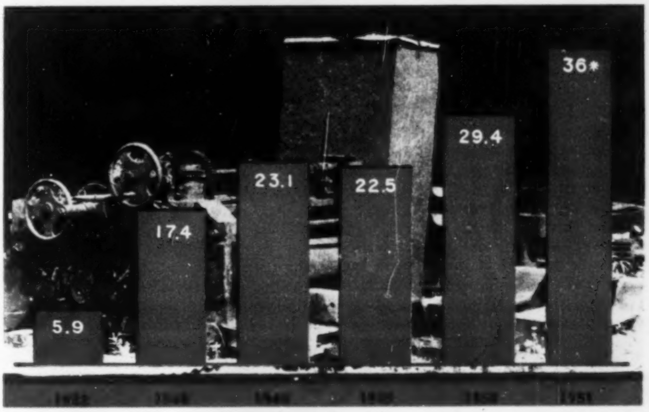
INLAND

# If You Can't Use It, Scrap It

**You may be amazed by what a scrap drive in your own plant will turn up. And gathering scrap today can pay you big dividends in providing more steel tomorrow**

### Purchased Scrap Volume Through the Years

*. . . the goal for this year means 3 million tons per month*



* Estimated

SCRAP again is your business.

Supplies available to steel mills and foundries are dangerously low. Within the past few months stocks have dwindled from a normal 60-day to only a few days' supply at most mills. Not much production has been lost yet. But unless the flow of scrap increases sharply and soon, large steel production losses will occur.

If you are to obtain all the steel possible and if this country's expanded steelmaking capacity is to be fully effective, nearly 7 million more tons of iron and steel scrap must move to steel mills and foundries this year than was shipped in 1950.

Purchased scrap requirements this year will be 36 million tons, or 3 million tons a month. That compares with 29.4 million tons used in 1950, a record year to date.

The 1951 figure represents a lot of material. It will fill more than 700,000 freight cars. It will cost mills and foundries $1.5 billion.

The new higher requirements mean that you will have to send back 5 tons of scrap this year for every 4 you returned last year—if you are to keep up with the national average.

**Where'll You Get It**—It isn't going to be easy. Demands for scrap now are exceeding the normal flow of industrial production scrap plus that realized from normal scrapping of old autos, farm equipment, ships, railroad equipment, bridges and similar equipment.

A special effort is indicated. It's getting underway in a national scrap drive sponsored by steel producers, scrap dealers, foundry associations, the National Production Authority and various local organizations. It is aimed at obtaining at least 8 million tons of dormant scrap. That much more is needed because of expected increased consumption plus some inventory building.

**Scrap Story in Brief**—The campaign is directed only toward "purchased" scrap as differentiated from "home" scrap. The latter is material generated by steel mills and foundries in their own manufacturing operations and is remelted in their furnaces.

Purchased or "market" scrap may be "production" scrap or dormant scrap. Production scrap is the leftovers derived in the process of manufacturing articles from steel. Manufacturing plants return the material, generally through dealers, to the steel mills for remelting. Production scrap generally is returned promptly, but in conversion to war production from peacetime output, the cycle may get out of adjustment. To some extent that is happening now, but the system is so well organized that maladjustments will be corrected soon.

Dormant scrap is the great hope of the current scrap drive. It comprises things like obsolete machinery, tools, dies, jigs and fixtures and other equipment, including items that are broken, worn beyond repair, abanddoned, or in need of parts that no longer can be obtained. It also could include scrap realized from wrecking or demolition projects.

**Why It's Needed** — A survey by STEEL reveals scrap stocks in leading steelmaking centers are frighteningly low. Pittsburgh mills have only 5 to 7 days' supplies. Chicago mills are little better off with 12 to 14 days' supply. All districts are far below normal. Cleveland has 7 to 30 days; New England, 7 to 21; Mid-Atlantic mills, 14 to 21 days; Detroit, 12 to 30 days; and the Youngstown district, 7 to 17 days.

What is worse is that incoming shipments are barely sufficient to maintain current production. Now is the season when mills traditionally build up their scrap inventories against the winter months when bad weather cuts down scrap collection, processing and shipping.

**Can Be Done**—The men who know scrap best, the dealers, believe the drive's goal can be reached provided enough steam is put behind it. One member makes this estimate: Two million tons of good heavy scrap could be realized from dormant scrap in industry. Another 2 million tons can be obtained from automobile graveyards; 1.5 million tons can be freed by Army, Navy and other government installations; 1 million tons can be returned from the Pacific Islands and Korean battlefields; 1 million tons can be collected from farms; and 500,000 tons can be obtained from ship breaking.

The metalworking industries will be primarily concerned with the first classification — the dormant industrial scrap—as well as speeding up the return of production scrap. Special sections of the campaign will be directed toward auto wreckers, farms and government sources.

**What To Do**—The scrap campaign's success will require the active support of top management. Here are some suggestions for making the drive effective:

1. Chief executives should appoint

**More Scrap Today . . .**

salvage committees with authority to make decisions.

2. Such committees should search all plants and properties of the company, regardless of size, for dormant scrap. They also should survey potential dismantling and wrecking projects that will produce scrap.

3. Make disposition of dormant and production scrap as quickly as possible. Scrap collections should be on a housekeeping basis. Besides recovering scrap, such benefits as tax reduction through inventory write-offs, improved safety conditions, lowered insurance rates, and more space for storage or production may be realized.

4. Executives should encourage other businessmen, not necessarily in metalworking, to institute cleanup and dismantling campaigns.

**Surprised Parties** — You may be amazed by what a scrap drive in your plant will turn up. A western Ohio company has just scrapped the dies used for making axles for Model T Fords. A large automobile maker reduced from 24 to 2 the number of sets of dies for fenders and other parts of early models which it had out among its suppliers.

In a small metalworking shop in Pennsylvania, the president read his scrap campaign literature, immediately took a stroll through his plant and ordered scrapped material which weighed 108 tons. At lunch, he told a friend about it. That afternoon, the friend strolled through his shop and scrapped almost as much obsolete material.

In Hamilton, O., General Manager John McQueen made a personal tour of the Columbia Machinery & Engineering Corp. and ordered scrapped between 2 and 5 carloads of jigs, fixtures, parts of machines and other obsolete equipment.

Chrysler Corp. started a campaign to turn up dormant scrap not uncovered in usual scrapping operations and immediately came up with 600 tons. The campaign is now being extended to vendors' plants.

Weber Lumber Co., Detroit, heard about the campaign and scrapped two boilers with steel smokestacks, water tank and piping. Result: 16 tons of heavy scrap.

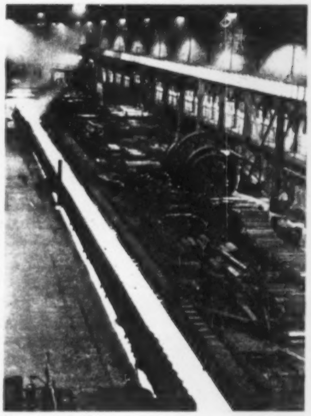
**The Local Angle** — Although the drive for dormant scrap is sponsored by NPA and national industry associations, the campaign is being waged on a local basis. Most industrial cities are organizing scrap mobilization committees through local chambers of commerce.

The current campaign differs from the 1943 wartime drive in that it is directed at heavy scrap. It is not a "pots and pans" campaign. No school children or housewives will be enlisted.

Scrap will be handled through regular channels and processed by established scrap dealers.

**String Savers**—Early experience in the drive suggests two obstacles: Lethargy and or indifference, and "string saving" tendencies. In Detroit, the local drive committee finds many company heads are unenthusiastic about scrapping obsolete equipment on the theory that "it might come in handy sometime." In several cases investigated, the material in question had been around for so long that the executives didn't know what it was used for originally.

**. . . More Steel Tomorrow**



# Moody Steel Allocations Investigation On in Detroit

INITIAL hearings in Detroit before the Senate subcommittee investigating steel allocations revealed inventory positions of various auto companies and unbearded the activities of one individual whose operations were described as "very, very gray" by the group chairman, Sen. Blair Moody (Dem., Mich.)

Ford Motor Co.'s purchasing vice president, Irving A. Duffy, told how the company had enough steel, even too much when issuance of copper cut-backs forced curtailment in assemblies and thus brought about an excess in steel. Ford actually sold a surplus of 32,000 tons to its suppliers at going market prices early this year, and another 25,000 tons when NPA Order M-47 forced another reduction in assemblies for the second quarter.

I. T. O'Brien, assistant to Chrysler Corp.'s general manager, told a different story. He had just completed a tour of Chrysler's steel suppliers and reported none was willing to give him a commitment for September shipments. Enough steel is in sight to build only 229,200 cars, compared with the NPA quota of 259,800 for the company in the third quarter. A September shutdown at Chrysler is a distinct possibility. He estimated the corporation's steel inventory will drop from 93,774 tons on July 1 to 53,434 on Sept. 1.

Marshall C. Thomas, a Norwalk, Conn., man who calls himself a "wandering purchasing agent," was subpoenaed by the committee and had to reveal some of his activities. Disclosed was a proposed deal to sell nickel anodes. Priced normally at 68.5 cents a pound in carloads, Mr. Thomas' anodes are available at $4.50. He buys them at $4 to $4.15, he testified.

## Warehouses Get More May Steel

For the second consecutive month, warehouses during May received more steel than any other classification of steel buyers, says American Iron & Steel Institute. Shipments for direct military use and shipments to the railroad industry were higher than at any time in several years.

The total of shipments to all classes of warehouses in May was nearly 1,231,000 tons, 18 per cent of the total steel shipments of 6,938,700 net tons. In five months this year, the warehouses received over 5.9 million tons, an increase of nearly 700,000 tons over the corresponding 1950 period.

The automotive industry received nearly 1,136,000 tons, 16.6 per cent of the total. That was less steel than the automotive manufacturers received earlier this year or a year ago.

Ordnance and other direct military needs, excluding ships and planes, received the greatest percentage increase of all classifications in May with a total of more than 104,000 tons, compared with 77,200 tons in April and 3,600 tons in May 1950. The aircraft industry took nearly 12,500 tons in May, more than four times over the amount one year earlier. Shipbuilding received nearly 90,000 tons.

Rail transportation received nearly 581,000 tons in May. In five months this industry received over 2.6 million tons. Oil and gas drilling received 79,000 tons of steel in May.

The total amount of steel shipped in May was second only to the March, 1951, total in the entire record of the industry. In five months, the shipments totaled 33,362,100 tons.

## NPA Gives More Steel Set-Asides

National Production Authority has notified steel producers to reserve certain percentages of their planned monthly production beginning in September. The set-asides for September are in addition to those already announced (STEEL, July 16, p. 44) and are for these carbon and low alloy, stainless and alloy products:

| CARBON AND LOW ALLOY | PERCENTAGE |
|---|---|
| Cold finished bars | 75 |
| Mechanical tubing, seamless | 90 |
| Mechanical tubing, welded | 45 |
| Pressure tubing, seamless | 95 |
| Pressure tubing, welded | 95 |
| High grade electrical sheets | 95 |
| Forgings | 75 |
| STAINLESS | |
| Mechanical tubing, seamless | 98 |
| Mechanical tubing, welded | 98 |
| Pressure tubing, seamless | 98 |
| Pressure tubing, welded | 98 |
| ALLOY | |
| Ingots | 75 |
| Blooms, slabs, billets (including projectile and shell quality) | 85 |
| Sheet bars | 50 |
| Tube rounds | 95 |
| Wire Rods | 75 |
| Bars, hot-rolled (including projectile and shell quality) | 85 |
| Bars, cold finished | 75 |
| Mechanical tubing, seamless | 95 |
| Pressure tubing, seamless | 95 |
| Sheets, hot-rolled | 75 |
| Sheets, cold-rolled | 75 |
| Strip, hot-rolled | 60 |

## Sulphur Shortage Studied

Utilization of sulphuric acid by the steel industry, consumed in large quantities as pickling liquor, is among studies to be conducted by a new Subcommittee on Sulphur, Conservation Coordinating Committee, Defense Production Administration.

# Original Auto Parts Makers Sight Detour

### Government curbs will cut auto assemblies—and original equipment business—23 per cent in the second half. Chances for more replacement or war business are not bright

MAKERS of original automotive equipment fear a rough ride ahead.

Government restrictions will limit U.S. auto assemblies to at least 2.4 million in the second half, 23 per cent less than the 3.1 million turned out in the first six months of 1951. That will mean a comparable loss of business for original parts makers.

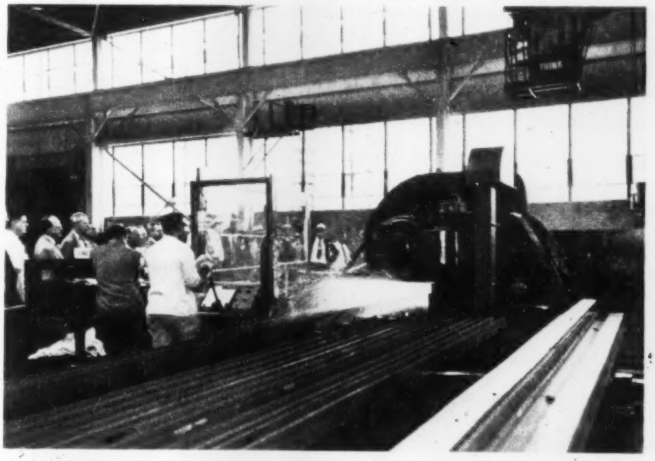
**Slack Taker?** — A conversion to war work would appear to be the best way to take up the slack, but not enough war work is yet available. One estimate has it that original parts suppliers will have laid off 50,000 by July 30. The majority of those are in the cities within a radius of 300 miles or so of Detroit. Facilities at those parts plants will be occupied by not more than an estimated 5 per cent for defense or defense-supporting activities by September and will not have appreciably more defense work before next year. One industry spokesman predicts a slight pick-up in the fourth quarter.

A Ford survey of 229 of its suppliers reveals that they have already had to lay off 7265 employees solely because of reductions in Ford's requirements. The 229 firms have been able to find defense jobs for only 2034 of those who have been let out.

**The Wherewithal** — The industry consists of an estimated 1900 companies whose major activity is supplying original automotive equipment. Of those, about 400 account for at least 90 per cent of the volume. Employment is an estimated 400,000. Those figures are far short of the total number of companies and working force whose livelihood depends at least in part on the auto assemblers. General Motors normally does business with 12,000 suppliers but the majority of those do not make automotive parts. Their products range from cutting fluids to paper clips.

Luckily, the shock of automobile cutbacks has thus far been cushioned for the original parts makers. There's a few-weeks' delay between the time when assemblies are curtailed and when the effects reach the suppliers. But the day of reckoning will come, the industry knows. It can solve its problem by competing more actively for defense business or going in more heavily for the manufacture of automotive replacement parts.

**New Approach**—Up to now, original parts producers have landed



STEEL DEPARTMENT STORE: To a layman the inside of Joseph T. Ryerson & Son Inc.'s new steel warehouse in Cincinnati resembles a huge steel department store: Every aisle is flanked with racks and storage bays for stocking steel of practically every kind and finish—bars, structural shapes, plates, sheets, strip and tubing. When Ryerson held an open house to show 3000 customers and friends what the inside of a modern warehouse looks like, the visitors saw such cutting operations as friction saw cutting, shown here most of their defense subcontracts from the prime contractors who are also their major civilian customers. To get more defense work, suppliers may have to go farther afield and establish new supply tiers.

To get more replacement parts work, some of the original parts people will also have a tough time, although many of them are already in that business as well as original parts. Replacement parts business will be good this year—it always is when new car output falls. The government recognizes the situation and will allow the industry—a highly competitive one—to produce at the rate of 112 per cent of 1950. Such an order has been drafted but not yet issued. On that basis, the 1951 volume will approximate $2375 million, an annual rate that was exceeded in the first quarter by $200 million. The excess was achieved with little help from companies not normally producing for replacement, so original equipment producers will have a hard time getting their foot further in the door of that market.

The situation is not yet desperate, but many in the original parts industry are realizing all doors to new business in a garrison economy are not wide open.

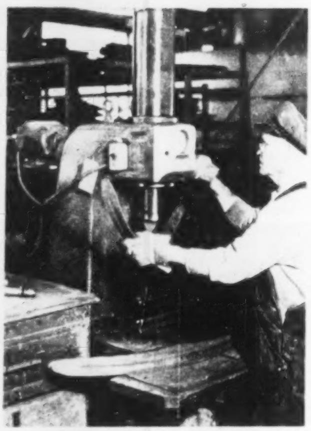
## New Alloy for Springs

### U.S. Spring & Bumper works out a chromium-molybdenum-vanadium alloy steel

FIRST TANGIBLE results of alloy steel research and development in the automotive industry in California is announced by United States Spring & Bumper Co., Los Angeles. The company has worked out a new alloy, a chromium-molybdenum-vanadium spring steel, called "Rauenloy," after its president, John B. Rauen.

**Intermediate Properties** — Mr. Rauen says the development of "Rauenloy" grew out of a need for an alloy steel of intermediate properties, which would have more ductility than the chrome-manganese spring steels, and also be free from the excessive "decarb" tendencies of silico-manganese spring steels. Its primary use will be in leaf springs for medium duty trucks.

"Rauenloy" steel, which is designed specifically for that type of service, will replace the higher alloyed, most costly steels which previously have been used in those applications. Mr. Rauen says the company also plans to adopt the new grade to its "silver line" agricultural equipment products, and will continue to experiment with other applications where a medium service spring steel is often required.



HARDNESS TEST OF "RAUENLOY"
*...spring leaf at U.S. Spring & Bumper*

**Co-operative Job** — Specifications for "Rauenloy" were developed under direction of Edgar Brooker, chief metallurgist for United States Spring & Bumper, in cooperation with Climax Molybdenum Corp., Vanadium Corp. of America, Kaiser Steel Corp. and Bethlehem Pacific Coast Steel Corp.

In the last 12 months numerous heats were made in an experimental induction furnace at the Kaiser Steel Corp.'s Fontana, Calif., plant to determine the most adequate specifications for the new grade.

**Bethlehem Rolls It** — Bethlehem Pacific's Los Angeles plant, which produces spring and alloy steels for United States Spring & Bumper Co. to provide springs for more than 40,000 automobiles monthly, recently made the first successful commercial rolling of "Rauenloy" and now is regularly producing this special steel for the exclusive use of the firm.

United States Spring & Bumper Co., established in 1917, since 1928 has produced springs, bumpers and other equipment for the West Coast assembly plants of such automobile manufacturers as Ford Motor Co., General Motors Corp., Chrysler Corp. and Studebaker Corp.

## Inco Develops New Alloy

International Nickel Co. has developed an alloy for use under conditions of high temperature and corrosion.

The new material, trade-named Incoloy, contains about 35 per cent nickel and 20 per cent chromium, with the balance iron. It is produced in most standard rolling mill forms, including sheet, strip, rod, wire and tubing. The alloy is designed for many purposes now served by some of the company's older alloys, which run up to over 70 per cent nickel.

## Nickel Curbs Set for September

National Production Authority says nickel will be allocated for manufacturing stainless steel products beginning with the September melting and continuing thereafter on a monthly basis.

NPA told the Stainless Steel Industry Advisory Committee that the basic problem which necessitates allocation of nickel is that of meeting requirements of the defense establishment, Atomic Energy Commission, the automotive industry and tonnages needed to meet allotments for production of consumer durable goods.

Committee members were requested by NPA to submit percentage formulas showing amounts of chromium, nickel and scrap which could be used to produce stainless steel.

## DPA Grants 221 Tax Benefits

The Defense Production Administration granted Bethlehem Steel Co. tax benefits authorizing it to amortize in five years 85 per cent of nearly $29 million in expansion costs to boost output of metallurgical coke and coal chemicals, as well as pig iron.

The award was one of the largest among 221 new projects to cost over $395 million deemed eligible for tax benefits by DPA in the week ended July 13. It brought to more than $8.1 billion the cost of new defense facilities considered eligible for amortization. Altogether, 2679 projects have been authorized for fast five-year write-offs.

## Only Five Get RFC Loans

Only five loans, totaling $4,940,000, were approved by the Reconstruction Finance Corp. in the week ended July 4. RFC turned down 36 other applications totaling $4,335,183 in the same period.

Largest of the loans granted, for $4.5 million, went to Carolina Giant Cement Co., Harleyville, S. C., a subsidiary of Giant Portland Cement Co., Philadelphia.

## Mill Will Change Hands Again

Universal Laboratories Inc. has entered into an agreement for the purchase of all the Ohio River Steel Corp.'s properties in consideration of Universal's new preferred stock with a par value of $2.5 million. The agreement is subject to approval of the stockholders of both companies.

Ohio River Steel owns and operates a steel mill at Toronto, O., formerly owned by Follansbee Steel Corp. It produces semifinished steel and has a capacity of about 12,000 tons of ingots a month.

Follansbee first sold the plant, which includes four open hearths, a bar mill and some annealing facilities, to Kovalchick Industries for $450,000. Kovalchick sold it to Francis Levien and Associates for about $650,000. The purchasers formed Ohio River Steel.

### Weirton Starts New Furnace

Ground has been broken at Weirton Steel Co., Weirton, W. Va., for construction of a new blast furnace with annual capacity of 480,000 tons, says Ernest T. Weir, chairman of National Steel Corp., parent organization of Weirton. A second furnace of like size is being built at Great Lakes Steel Corp., another National Steel subsidiary.

The two furnaces are part of National Steel Corp.'s expansion, expected to cost $150 million and increase annual ingot capacity to 6 million tons by 1953 from the total of 4,750,000 on Jan. 1, 1951.

### Foundry Added to New Plant

Revision of plans for the new plant Fairbanks, Morse & Co. will build in Kansas City, Mo., increases cost of the facility to $7.5 million from the original $5 million reported when plans were announced in August, 1950. First designed only for scale production, the increased cost makes possible addition of a foundry for producing engines and pumps.

### Columbia Wins Fast Write-off

A 60 per cent certification on a $17,978,830 part of an approximate $28,000,000 expansion has been granted by the Defense Production Administration to Columbia Steel Co., San Francisco, operating subsidiary of U. S. Steel Corp.

The certification, which allows for a faster write-off of taxes, covers facilities to increase the production of cold rolled strip at the company's Pittsburg, Calif., plant.

Work has been under way on the Columbia expansion since the beginning of the year. The extensive development, second major expansion in the last few years, includes additions to nine buildings which will house new equipment, principally a new four stand cold reduction mill that will increase the sheet and tin mill production capacity of Columbia to about 291,000 tons a year.

### Wisconsin Steel Expands

Wisconsin Steel Division of International Harvester Co. will expand pig iron and coke making facilities and modernize its cold-finishing bar department.

Company is building 15 Wilputte coke ovens with completion scheduled for January, 1952. Those will increase coke making capacity by about 200 tons a day or 70,000 tons a year.

No. 1 blast furnace, to blow out Aug. 1, will be enlarged 3000 tons per month—from 18,000 to 21,000 tons. The plant has three blast furnaces with total annual capacity of 719,710 net tons.

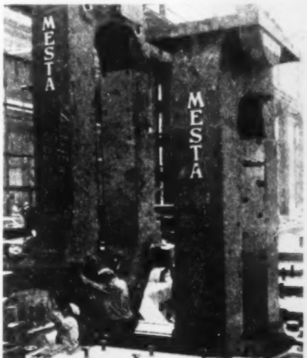
Work in the cold-finishing department will consist of rehabilitation and modernization.

The government has granted tax write-off benefits on the projects—$2,082,484 for the coke facilities, $2,131,499 for the pig iron plant and $1,050,744 for the steel bar facilities.

### Wheeling To Spend $24 Million

Latest construction and improvement program planned by Wheeling Steel Corp. totals $24 million and brings the company's postwar expansion costs to $100 million, says John L. Neudoerfer, president.

Since 1946 more than $70 million has been invested in new plant, equipment and property in East Steubenville, Beech Bottom and Wheeling, W. Va. and Steubenville, Yorkville and Martins Ferry, O. Resulting annual ingot capacity increase is 516,000 net tons, raising annual rated capacity to 1,860,000 net tons from 1,344,000 net tons in 1946. Annual capacity for butt-weld pipe is increased 120,000 net tons.



COLD MILL HOUSING
*. . . eased into place for Columbia*

A battery of 63 by-product coke ovens, now under construction at a cost of about $9 million, will give Wheeling 314 ovens with by-product facilities and raise the company's annual coke capacity 365,000 net tons to 1,661,000. Completion in 1953 of the program just getting underway will raise annual pig iron capacity 121,500 net tons to 1,800,000 and annual ingot capacity 150,000 net tons to 2,010,000.

## Battle of WOCs Is On

### The U. S. policy of hiring industry men without compensation is again attacked

THE BATTLE of the WOCs is on in Washington.

WOCs are industrialists serving without compensation in government, particularly in the National Production Authority. As of May 31, 153 of the 3888 NPA personnel were drawing no salaries from the U. S. Most were being paid by their companies.

**Bone of Contention**—The issue of dollar-a-year men in government has been blowing hot and cold ever since World War II when hundreds of industry people served the nation on that basis. Industry's "lend-lease" of personnel was almost totally out late in 1949 when Sen. Harry F. Byrd (Dem., Va.) led an attack on the policy by influencing the Senate to refuse to confirm U. S. Steel Vice President Carl A. Ilgenfritz as chairman of the Munitions Board on a dollar-a-year basis. Senator Byrd's attitude at that time was: "We haven't got down to the point where we must have government positions subsidized by outside interests."

But when the Korean War started, the executive branch of the government realized the need for competent men to help with the controls program and influenced Congress to write permission to hire without compensation into subsection 701-B of the Defense Production Act of 1950. Now that a new defense act is hanging fire, Congress is again sniping at the WOC policy, notably Rep. Emanuel Celler (Dem., N. Y.) and his Subcommittee on Study of Monopoly Power, House Judiciary Committee.

**Champion**—In committee hearings last week, NPA Administrator Manly Fleischmann made a strong case for WOCs. He stated flatly: "The defense program requires the services of WOC employees. I hope that the committee and the Congress will continue to make it possible for us to bring in men of the high caliber needed to do the job." Mr. Fleischmann pointed out that WOCs are appointed to advisory or consultative positions primarily, to other positions only when the job requires outstanding experience and ability not obtainable on a full-time salaried basis.

Mr. Fleischmann also pointed out the value to the U. S. of the people helping NPA without compensation on the Industry Advisory Committees, although few of those are serving the government full-time and that procedure is not under attack. As of June 5, NPA had 378 such committees on which 4500 executives were serving. By yearend, NPA will probably have 600 to 800 of those groups with from 10,000 to 11,000 members serving.

## A. O. Smith Adds Parts Plant

The Air Force is taking over the former Odenbach Shipbuilding Corp. plant in Rochester, N. Y., for use by A. O. Smith Corp., Milwaukee, as an airplane parts facility. Smith will lease the plant for work on its second contract from Boeing Airplane Co.

## Afran To Get Three Tankers

Bethlehem Steel Co., Shipbuilding Division, has Maritime Administration approval to build two 28,000-ton tankers for Afran Transport Co., a Liberian corporation, subsidiary of Gulf Oil Corp. Bethlehem-Sparrows Point Shipyards Inc. will construct another of similar size for Afran.

## Giant Carrier Is Contracted

Contract for building a 59,900-ton aircraft carrier has been awarded by the Navy to Newport News Shipbuilding & Drydock Co. The carrier will be 1040 feet long, have an extreme width of 252 feet and has an estimated contract value of $218 million. About 36 months will be required for construction.

Also awarded is a $15 million contract to Bath Iron Works, Bath, Me., for a 1450-ton anti-submarine destroyer escort.

## Rockford Plant Produces At Last

One of the country's most modern shell-machining plants—the Army's Rockford, Ill., facility—finally will get into production of 155-millimeter shells in August. Work will be done by W. F. & John Barnes Co. of Rockford under a cost-plus-fixed-fee contract with Chicago Ordnance District. The plant was designed by Barnes in World War II, but never operated past pilot production. Recently, the company also got a contract to equip the second of the plant's three units for making 105-millimeter cold extruded shells. This line won't enter production before mid-1952.

## Air Force Tools Available

The U. S. Air Force Air Materiel Command has invited Air Force contractors to send representatives to select machine tools best suited for their needs from the Marietta, Ga., and Omaha, Nebr., machine tool storage sites.

To schedule your visit, get in touch with Industrial Equipment Section, Production Resources Division, Air Materiel Command, U-B Bldg., Fourth & Main Sts., Dayton, O. Attention MCPBXE.

The Industrial Equipment Section has been housekeeper for several million dollars' worth of machine tools at the two sites since the end of World War II.

The tools include grinders, millers, lathes, drills, routers, press brakes and screw machines. In the past, selection of the tools has been from stock record cards, with physical selection being minimized.

## STEEL's Weekly Summary of Subcontract Opportunities

A WHOPPING ADDITION to commitments at Mack Trucks Inc., plus other awards to heavy metalworking industries, should be good news for supplier companies not equipped for precision manufacturing required in aircraft and electronics programs.

Mack's new order is for military trucks and spare parts and totals $52,130,000. Added to the $25 million award the company got in March and to the work being done on tank parts, it makes a total backlog of approximately $100 million. The trucks will be built at New Brunswick, N. J., and assembled at Allentown, Pa.

Production begins immediately at DeVilbiss Co., Toledo, O., on a big order for air compressors. The award, termed "one of the largest in the company's history" by president Howard P. DeVilbiss, was placed by the Ordnance Tank-Automotive Center, Detroit.

In other contracts, Perfection Stove Co., Cleveland, will assemble 1783 Automotive Winterizing Kits at a cost of $3,335,000 . . . Willys-Overland Motors Inc., has a $3.3 million award for 1330 trucks . . . Mullins Mfg. Co., Salem, O., will make 317,000 shells under a $1 million contract.

More contracts, awarded by the government, are included in STEEL's weekly summary:

| PRODUCT | CONTRACTOR |
|---|---|
| Air Compressors | Chefford Master Mfg. Co., Milan, Tenn. |
| | Rheem Mfg. Co., Richmond, Calif. |
| | Independent Plow Co., Neodesha, Kans. |
| | Hardie-Tynes Mfg. Co., Birmingham, Ala. |
| Minesweepers | National Steel & Shipbuilding Corp., San Diego |
| | M. M. Davis & Son Inc., Solomons, Md. |
| | Lake Union Dry Dock Co., Seattle |
| | Tacoma Boat Building Co. Inc., Tacoma, Wash. |
| | Wilmington Boat Works Inc., Wilmington, Calif. |
| | Tampa Marine Co., Tampa, Fla. |
| | Higgins Inc., New Orleans, La. |
| | Martinolich Shipbuilding Co., San Diego |
| | Hodgdon Bros., Goudy & Stevens, East Boothbay, Me. |
| | Pacific Boat Building Co., Tacoma, Wash. |
| Barges (deck or liquid cargo) | Hub City Iron Works, Lafayette, La. |
| Barges (deck cargo) | Willy Mfg. Co., Port Deposit, Md. |
| Barges (refrigerated cargo) | Kelly Ryan Equipment Co., Blair, Nebr. |
| Radio Transmitters | Sierra Electronics Corp., San Carlos, Calif. |
| | Radio Marine Corp. of America, New York |
| Radio Receiving Sets | Communications Co. Inc., Coral Gables, Fla. |
| Radio Beacons | Maryland Electronics Mfg. Corp., College Park, Md. |
| Motor Generators | Vickers Electric Div., Vickers Inc., St. Louis |
| Motor Generators & Frequency Regulators | Electric Specialty Co., Stamford, Conn. |
| Signal Generators | Trad Television Corp., Asbury Park, N. J. |
| Centrifugal Fans | Claroge Fan Co., Kalamazoo, Mich. |
| | United States Air Conditioning Corp., Minneapolis |
| Transformers | Rauland Borg Corp., Chicago |
| | Standard Transformer Corp., Warren, O. |
| Pumps, Motor Driven | Pacific Coast Div., A. O. Smith Corp., Los Angeles |
| | Vickers Inc., Detroit |
| | Ingersoll-Rand Co., Phillsburg, N. J. |
| | Aurora Pump Co., New York |
| Pumps, Steam Driven | Warren Steam Pump Co. Inc., New York |
| | Buffalo Pumps Inc., Buffalo |
| | M. T. Davidson Co., Beacon, N. Y. |
| | DeLaval Steam Turbine Co., E. Trenton, N. J. |
| Jack Assemblies | United Truck & Equipment Co., Baltimore |
| Portable Engine Hoists | Safway Steel Products Inc. Milwaukee |
| Trucks | J. H. Holan Corp., Cleveland |
| Truck Chassis, with Cabs | Autocar Sales & Service Co., Ardmore, Pa. |
| Truck Tractors | Four Wheel Drive Auto Co., Clintonville, Wis. |
| Truck Ambulance | Fargo Motor Corp., Detroit |
| Semitrailers | LaCrosse Trailer Corp., LaCrosse, Wis. |
| | Adam Black & Sons Inc., Jersey City, N. J. |
| | Trailmobile Co., Cincinnati |
| Dump Cargo Body Assemblies | Gar Wood Industries Inc., Wayne, Mich |
| Spindles, with Hubs & Wheel Assemblies | Bryant Heater Co., Cleveland |
| Truck Tractors (Diesel) | Corbitt Co., Henderson, N. C. |
| Semitrailer (Refrigerator) | Gramm Trailer Corp., Lima, O. |
| Gasoline Tractors | Gibson Mfg. Co., Longmont, Colo. |
| Trucks | Tips Engine Works, Austin, Tex. |
| Motor Scooters (3-wheel) | Cushman Motor Works Inc., Lincoln, Nebr. |
| Motor Scooters (2-wheel) | Simplex Mfg. Corp., New Orleans, La. |
| Upper Drive Assemblies | Western Reserve Mfg. Co., Cleveland |
| Shells | W. C. Norris Mfrs. Inc., Tulsa, Okla. |

# CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to U. S. Commerce Department, Division of Printing Services, attention E. E. Vivian, Room 6225, Commerce Bldg., Washington 25. For ESA orders, write J. L. Miller, Economic Stabilization Agency, Room H367, Temporary E Bldg., Washington 25.

## Materials Orders

ELECTRIC UTILITIES — M-50 as amended July 17 places electric utilities under the Controlled Materials Plan. Utility companies must obtain authorization from the Defense Electric Power Administration to commence construction of major plant additions. CMP allotment number of major additions is H-3. Allotment number for minor requirements is H-4.

CHEMICALS—M-32 as amended July 17 limits the percentage of rated orders producers are required to accept of the following chemicals: Chrome yellow, 30 per cent; chrome orange, 30 per cent; phenol formaldehyde resin with filler, 35 per cent; phenol formaldehyde resin without filler, 45 per cent.

RUBBER—M-2 as amended July 17 removes the ban on spare tires for new passenger automobiles.

COPPER—Amendment of July 13 to M-16 places all copper raw materials under allocation. Materials covered include refined copper, brass mill scrap, copper-base alloy scrap, unalloyed copper scrap, fired and demilitarized cartridge and artillery casings, copper and copper-base alloy ingot, copper and copper-base alloy shot and waffle, and copper precipitate. Beginning Aug. 1, only copper refiners and scrap dealers will be permitted to accept delivery of copper raw materials without specific NPA authorization.

CONSTRUCTION—Applicants for permission to commence construction henceforth will use form CMP-4C, a Controlled Materials Plan form that serves both as a construction application and application for allotment of steel, copper and aluminum. It replaces NPAF-24.

## NPA Regulation

PRIORITIES — NPA Regulation 2 as amended July 17 brings the basic rules of the priorities system up to date and liberalizes provisions on use of DO ratings to replace materials taken from inventory.

## CMP Regulations

IMPORTED STEEL—Direction 4 to CMP Regulation 1 permits fabricators who acquire foreign-produced steel to use it to augment their authorized production schedules under the Controlled Materials Plan. The direction stipulates that no copper or aluminum above the manufacturers allotment of these metals may be used in connection with an augmented production schedule.

OPERATING SUPPLIES—CMP Regulation 5 as amended July 17 revises definition of operating supplies and permits producers of controlled materials to obtain other controlled materials as operating supplies.

SMALL USERS—Direction 1 to CMP Regulation 1 as amended July 12 extends to all small users of steel, copper and aluminum the benefits of CMP allotments. Producers affected are those whose quarterly requirements for the manufacture of Class B products, and of other items in the same product class, do not exceed the following amounts of controlled materials: Carbon steel, 5 tons; alloy steel, except stainless, 1000 pounds; stainless steel, none; copper and copper-base alloy brass mill products, copper wire mill products, copper and copper-base alloy foundry products and powder, 500 pounds; aluminum, 500 pounds. They are authorized to use the allotment symbol SU (small users) on delivery orders for controlled materials within above limits.

ALLOTMENTS—Amendment 1 to CMP Regulation 1 emphasizes that recipients of allotments under CMP are limited in their use of steel, copper and aluminum to the amounts authorized by their allotments. Language of the regulation is strengthened to make clear that if you receive an allotment under CMP, you may not purchase additional materials of any kind to augment output of items for which allotment was made.

### Defense Contracts Placement

*. . . the top 50 companies*

| | Company | Dollar Volume of Defense Contracts |
|---|---|---|
| 1. | General Motors Corp. | $3,500,000,000 |
| 2. | Ford Motor Co. | 1,000,000,000 |
| 3. | Boeing Airplane Co. | 960,000,000 |
| 4. | Curtiss-Wright Corp. | 840,240,000 |
| 5. | Lockheed Aircraft Corp. | 674,300,000 |
| 6. | Republic Aviation Corp. | 549,040,000 |
| 7. | General Electric Co. | 500,000,000 |
| 8. | United Aircraft Corp. | 490,000,000 |
| 9. | North American Aviation Inc. | 481,897,000 |
| 10. | Bendix Aviation Corp. | 475,000,000 |
| 11. | Grumman Aircraft Engrg. Corp. | 410,000,000 |
| 12. | International Harvester Co. | 355,000,000 |
| 13. | Western Electric Co. | 343,000,000 |
| 14. | McDonnell Aircraft Corp. | 269,000,000 |
| 15. | Westinghouse Electric Corp. | 245,000,000 |
| 16. | American Locomotive Co. | 229,000,000 |
| 17. | Chrysler Corp. | 223,417,000 |
| 18. | American Woolen Co. Inc. | 208,284,000 |
| 19. | Allis-Chalmers Mfg. Co. | 200,000,000 |
| 20. | Packard Motor Car Co. | 199,500,000 |
| 21. | Sperry Corp. | 198,000,000 |
| 22. | Nash-Kelvinator Corp. | 192,000,000 |
| 23. | Douglas Aircraft Co. Inc. | 172,129,000 |
| 24. | Consolidated Vuitee Aircraft Co. Inc. | 152,500,000 |
| 25. | J. P. Stevens & Co. Inc. | 151,900,000 |
| 26. | Firestone Tire & Rubber Co. | 142,041,000 |
| 27. | Fairchild Engine & Airplane Corp. | 127,154,000 |
| 28. | Bethlehem Steel Co. | 127,056,000 |
| 29. | Bell Aircraft Corp. | 125,092,000 |
| 30. | Food Machinery & Chemical Corp. | 125,000,000 |
| 31. | Willys-Overland Motors Inc. | 124,350,000 |
| 32. | Avco Mfg. Corp. | 122,000,000 |
| 33. | Newport News Shipbuilding & Drydock Co. | 120,400,000 |
| 34. | Northrup Aircraft Inc. | 119,144,000 |
| 35. | Glenn L. Martin Co. | 108,900,000 |
| 36. | Radio Corp. of America | 108,560,000 |
| 37. | Goodyear Tire & Rubber Co. | 108,000,000 |
| 38. | American Car & Foundry Co. | 105,000,000 |
| 39. | Raytheon Mfg. Co. | 103,500,000 |
| 40. | Studebaker Corp. | 97,845,000 |
| 41. | Beech Aircraft Corp. | 86,000,000 |
| 42. | Standard Oil of N. J. affiliates | 82,000,000 |
| 43. | Emerson Electric Mfg. Co. | 75,000,000 |
| 44. | Kaiser-Frazer Corp. | 65,550,000 |
| 45. | Caterpillar Tractor Co. | 65,000,000 |
| 46. | Baldwin-Lima-Hamilton Corp. | 65,000,000 |
| 47. | United States Rubber Co. | 64,000,000 |
| 48. | Diamond Motor Car Co. | 55,000,000 |
| 49. | United States Steel Co. | 55,000,000 |
| 50. | Eastman Kodak Co. | 44,694,000 |

## Price Regulations

INVENTORY WINDFALLS — Amendment 17 to General Ceiling Price Regulation, effective July 17, eliminates provisions which prohibit manufacturers and processors from obtaining inventory windfalls.

PIG IRON—Supplementary regulation 38 to General Ceiling Price Regulation permits producers of pig iron who use foreign iron ore to apply for ceiling price adjustments.

MACHINE TOOLS—General Overriding Regulation 15, effective July 16, permits machine tool manufacturers to make individual adjustments in ceiling prices (See STEEL, July 16, p. 45).

GEORGIA BROWN IRON ORE—Supplementary regulation 41 to General Ceiling Price Regulation raises ceiling price on brown iron ore produced in Georgia to encourage new exploration and development. Increase is 2 cents a long dry unit.

## Lone Star Expansion Rushed

Work is progressing swiftly near Daingerfield, Tex., on Lone Star Steel Co.'s $75 million expansion of open hearth and steel pipe facilities. Commitments totaling $34.5 million were made by July 1.

Purchase orders have been issued for the furnace equipment, and orders are being rushed for the pipe-making machinery, roller hearth furnaces, threading machines and tube heating furnaces. Tests have been completed on the continuous normalizing furnaces for the pipe mills and letter of acceptance issued to Selas Corp. of America, Philadelphia. General Electric Co. will supply $4 million in drive motors and controls, ventilating equipment, a turbine generator set and electrical distribution equipment. United Engineering & Foundry Co., Pittsburgh, is handling construction.

## Birmingham Woos Industries

Its appetite merely whetted by a record-breaking postwar industrial expansion, the Birmingham district is now wooing new industries, sales offices and warehouses with a $600,000 five-year promotional campaign.

The program, launched by a Committee of 100 of the Birmingham district's business leaders, was inspired by the success of the committee in bringing 26 new industries and many smaller enterprises into the district last year.

# Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

**Fate of the McCarren-Walter delivered-price bill probably will be the same as the O'Mahoney bill of last year. The President will likely veto it**

ALTHOUGH the House will probably pass the McCarren-Walter delivered-price bill pretty much the way it comes from the Senate, the bill is not likely to become law. President Truman very likely will veto it—just as he vetoed the O'Mahoney bill.

Final Senate debate is scheduled for Aug. 2 and 3; the vote due on the second day. You have it on the word of Majority Leader Ernest W. McFarland (Dem., Ariz.) that the bill will pass the upper chamber.

Opinion among many congressmen—and for that matter among industry spokesmen in Washington—is that a veto by the President would not be an irreparable loss. The overall delivered pricing system has changed drastically since the Supreme Court's cement case decision.

**Proof of the Pudding**—Time and again in the last few months the Federal Trade Commission stated there is nothing inherently wrong about freight absorption, selling at delivered prices or meeting a competitor's price. And, just as the proof of the pudding is in the eating, FTC only last month made good on its assurance by recognizing the right of steel companies to quote delivered prices—and absorbing freight in doing so—provided they act innocently and independently.

Prevailing objections to the McCarren-Walter bill stem from two sources, one FTC, the other the Kefauver-Long-Douglas contingent in Congress. The great objection is that where the Robinson-Patman Act places the burden of proof upon the seller accused on discrimination, the McCarren-Walter bill would shift it to FTC.

**"Impossible Proof"**—A burden like that would make the job of the commission "almost impossible," says Senator Long. The other big objection is that the McCarren-Walter bill might provide a legal basis for revival of presently outlawed basing-point systems. Under the bill, says Senator Douglas, a basing-point system could not be found illegal unless it were proved to result from and be maintained by a conspiracy—and such proof might be impossible.

## Defense Contracting Broods . . .

Two more defense contracting "pools" were approved by Defense Mobilizer Charles E. Wilson. One is the Coordinated Manufacturers of Santa Clara County, comprising 51 small companies. It is a corporation with headquarters in San Jose, Calif. The other is the Greater New York Manufacturers Pool, made up of 77 small concerns.

The New York organization is of the "mother hen" type: International Banding Machine Co., 1013 Grand St., Brooklyn 11, N. Y., is the mother hen, acting as manager and contracting authority. The first approved pool was Omaha Industries Inc., Omaha, Neb., a corporation made up of an even 100 small companies in the Omaha area.

## Another Sponge Iron Try . . .

That perennial will-o-the-wisp—a successful sponge iron process—may be up for another try—at government expense. Under heavy pressure from certain members of Congress, NPA officials are seriously considering taking another look at the Maderas process. Their plan calls for a plant at Longview, Tex., that would operate on natural gas and Texas brown ore.

Promoters are said to be asking $7 million from the government to erect a plant and get it into production. The goal, of course, is twofold: To get increased production of iron; to produce pure iron for accurate alloying. War Production Board's Office of Production Research & Development rejected the Maderas process during World War II.

INTERPRETER: F. Stewart Stranahan is top man at the Office of Price Stabilization for answering questions and making interpretations in metals and machinery pricing. He served as acting division counsel on OPS' Industrial Materials & Manufactured Goods Division since March; is now the division's counsel. Originally a banker and lawyer, he was chief counsel for the Machinery Branch, OPA in World War II and served as a government lawyer with NLRB, Justice's Antitrust Division, and the Office of the Housing Expediter

## Accent on Machine Tools . . .

Because of the increased importance of machine tool production, a new division—the Metal Working Equipment Division—was established within the Industrial & Agricultural Equipment Bureau of NPA. It will handle Controlled Materials Plan paper for the metalworking machinery industry and be responsible for the proposed expansion in the industry.

H. L. Tigges, executive vice president of Baker Bros. Inc., Toledo, O., is director of the division.

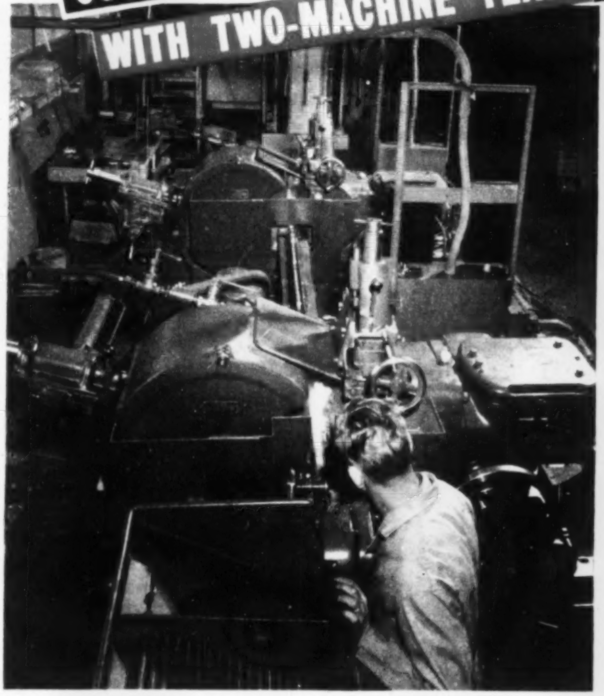
Walter C. Schirmer, with NPA and on leave from his position as vice president of Clark Equipment Co., Buchanan, Mich., replaces Mr. Tigges as head of the General Industrial Equipment Division of NPA.

M. B. Garber, on leave from Thew Shovel Co., Lorain, O., where he is sales director, replaces Neal Higgins as director of the Construction Machinery Division. Mr. Higgins is returning to his executive position with International Harvester Co., Chicago.

## Munitions Board Assistant . . .

Robert M. Hatfield Jr., western general manager of Combustion Engineering Superheater Inc. in Glendale, Calif., was named by Munitions Board Chairman J. D. Small as vice chairman for Government Agencies of the board. Mr. Hatfield, who will serve without compensation, will also be executive assistant to Chairman Small. He served recently as chief of the Power Equipment Division of NPA.

# CONTINUOUS GRINDING WITH TWO-MACHINE TEAM DOUBLES PRODUCTION



Two CINCINNATI FILMATIC No. 3 Centerless Grinders, in the plant of a prominent aviation equipment manufacturer, equipped to continuously grind piston rods.

• One of the most economical ways to achieve large volume production is by the continuous machining method. How this was accomplished for precision grinding operations is illustrated here . . . two CINCINNATI FILMATIC No. 3 Centerless Grinders are hitched together to pull the production load of grinding piston rods. A CINCINNATI Feedmatic Hopper starts them through the first machine and a conveyor takes them to the second machine for the finish grind. And to maintain the highest quality finish, filters remove sludge from the coolant. Now one man controls this production team, and output per man hour is more than double the former method. ¶Continuous production becomes a reality with CINCINNATI FILMATIC Centerless Grinders handling the job. Their FILMATIC grinding wheel spindle bearings will never quit regardless of the load . . . lubrication is principally automatic . . . hydraulic grinding wheel truing . . . variety of standard attachments, including Feedmatic Hoppers for thrufeed and infeed operations. Other features and advantages are outlined in catalog No. G-570-1, and brief specifications may be found in Sweet's Catalog File.

**CINCINNATI GRINDERS INCORPORATED**
**CINCINNATI 9, OHIO**

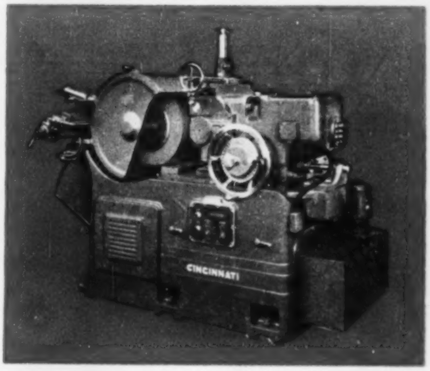
CINCINNATI Type "E" Feedmatic Hopper

FILMATIC

PRODUCTION DATA

| | |
|---|---|
| *Part name* | Hydraulic piston rod (14" long) |
| *Material* | Alloy steel |
| *Stock removal* | First machine .061" on diameter<br>Second machine .005" on diameter |
| *Surface finish* | 20 micro |
| *Production* | 143 per hour |

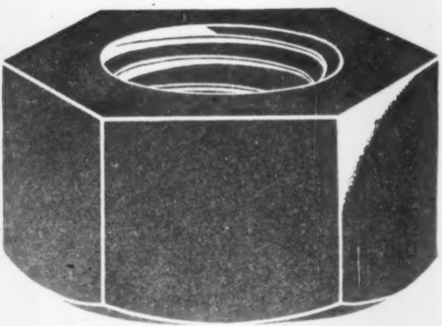
CINCINNATI



CINCINNATI FILMATIC No. 3 Centerless Grinding Machine. Complete specifications may be obtained by writing for catalog No. G-570-1.

# CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES



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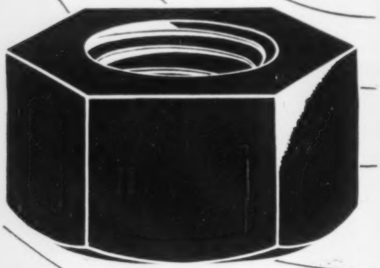

Clean, accurate threads that turn easily and hold tight are a matter of course with Republic Upson Products. The newest precision equipment—plus the skill and experience gained during almost a century of nut-making—enable Republic to make every nut consistently uniform, unvaryingly accurate. Over 20,000 shapes and sizes to meet all your standard nut and bolt needs!

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℞ **FOR TOP STEEL PRODUCTION**... keep your scrap moving to the mills. Call your scrap dealer today.

# U.S. Coal To Aid Europe's Industry

## A shortage of some 11 million tons in this quarter threatens to curb industrial production. U. S. shipments will rise, particularly to Germany, France and Belgium

U. S. COAL exports are increasing to help meet a shortage that threatens industrial production of all Western European nations except Great Britain. Even the United Kingdom is troubled by a coke scarcity.

All European nations will need an estimated 11 million tons more of coal in this third quarter than they are likely to mine or import. The shortage was 6.6 million tons in the second quarter, says the Economic Commission for Europe.

**A Big Bunker**—U. S. coal exports to countries other than Canada, estimated at close to 14 million tons for the first half of 1951, are expected to total about 31 million tons for the calendar year. Western European demand will be especially strong.

Shipments of anthracite overseas during the first quarter of 1951 totaled 147,000 tons and are estimated at 450,000 tons for the first six months of the year. Anthracite exports to countries other than Canada are expected to reach about 1 million tons by Dec. 31. For the first four months of 1951 bituminous exports to countries other than Canada totaled 7,967,000 tons and are estimated at 13.3 million tons for the first half. In view of an expected larger overseas movement in the next six months, it's estimated that overseas bituminous exports for 1951 will exceed 30 million tons.

**Below the Peak** During the peak year of 1947, bituminous exports to countries other than Canada totaled 42,819,000 tons and anthracite exports 4,040,000 tons. Shipments abroad declined in 1948 to 20,088,000 tons of bituminous and 1,744,000 tons of anthracite. The decline continued through 1949 and 1950. In 1949, 11,744,000 tons of soft coal and 1,359,000 tons of hard coal were exported. In 1950, exports included 2,459,000 tons of bituminous and 93,000 tons of anthracite.

The U. S. economy can easily afford the exports because soft coal output this year is running at a rate 13 per cent ahead of last year's production. Getting most of the exported U. S. coal are West Germany, France and Belgium.

### Paradox in German Coal

The German coal situation is paradoxical. Steel and foundrymen are importing about 300,000 tons of the American product monthly, although domestic mines are exporting the fuel to France. The reason: Allied armistice terms force monthly deliveries to France.

### French Coal Lack 16 Million Tons

Some 13 per cent of the Ruhr's current steel ingot production is made possible by American coal. The fuel is more expensive than domestic and has increased steelmaking costs proportionately. The government just permitted users of the coal to pass along the added costs to their customers. Steel producers believe that imports of American coal will rise rapidly in the next few months, from the present 300,000 tons monthly to about 450,000 tons. The republic figures it will be short 3.3 million tons of the fuel this quarter.

German coal miners' wages have just been raised 12 per cent retroactive to May 1, 1951. Miners' wages have doubled since the end of World War II, although the average coal digger is getting the equivalent of only $101.20 a month. Domestic coal prices will not be raised, but the 12 per cent increase will be paid for in higher export quotations and a reform in federal taxation of coal companies.

A steel allocation program is still in the works, but details have not yet been fully worked out.

The reorganization of the Ruhr steel and coal industries under the controversial Allied Law No. 27 is still not very far along. The first five steel companies to be so reorganized were to be operating under their own steam this summer. Thus far, nothing much has happened, although the five promise they'll be ready for business by Aug. 1.

French and Saar coal production in 1951 will total about 66 million net tons, but consumption will exceed 82 million tons. The 16-million ton deficit must be imported, chiefly from the U. S. and Germany.

The French coal industry is largely nationalized, and nationalized industries will get close scrutiny by the new French National Assembly elected on June 17. Sweeping reorganization of all government-owned industries is likely.

One partly nationalized industry that's doing all right is automotive manufacturers. In the first five months of 1951, the French turned out 184,875 vehicles, compared with 134,062 last year.

### Britain Needs More Coke

The British have enough coal, but not sufficient coking facilities. Foundrymen, particularly, are hard hit, and foundry iron is inadequate.

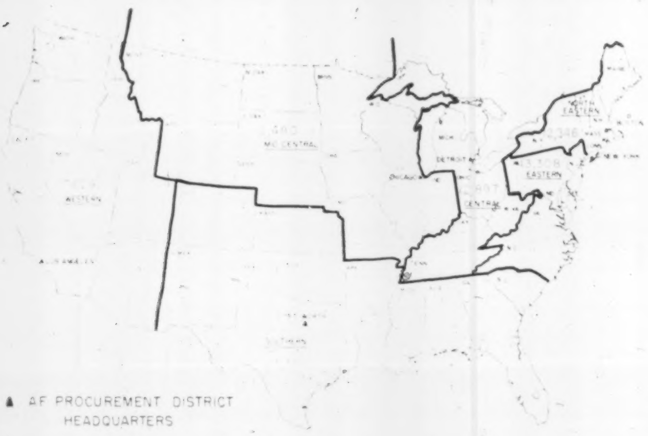
If foundrymen and other coke users don't build up stocks soon, they never will during the winter which is traditionally a period of less coke output for industrial consumption.

Wide World

FOR FRENCH AIRBORNE: The new French Army 75-mm recoilless cannon, designed for use by airborne troops is demonstrated on the proving ground at Bourges, France. The cannon weighs about 154 pounds and is similar to the American 75-mm recoilless rifle

**61,251 Aircraft Subcontractors—And Still More To Come**

(Number of Subcontractors by Air Force Procurement Districts)



# Aircraft Subcontracting—It's Here To Stay

## And because the peak of subcontracting is from 18 to 24 months away, many more thousands of subcontractors will still be needed

By NORMAN LYNN
*Los Angeles Correspondent, STEEL*

AIRCRAFT INDUSTRY buyers are literally rolling out the red carpet for potential subcontractors who can meet the high standards of today's jet aircraft. Regarded as a necessary evil in World War II, subcontracting is now proving to be economically desirable.

Measured by World War II standards the volume of subcontracting is low, but on a percentage basis it is gaining altitude fast. The pace and character of aircraft subcontracting is shaped by two factors: The kind of rearmament program we are in and the rapid evolution of the jet airplane. Particularly needed for air power are additional assembly lines, additional plants—and orders so placed that they won't require great quantities right away. But plants must be ready to produce at full blast within 24 hours.

Although $14.5 billion was set aside for production of aircraft to last until late 1953, the peak of production will not be reached till 1952.

**No Hurry, No Scurry**—In the present emergency the government and the aircraft industry have had more time to plan for production expansion than was possible in World War II. Hurry and scurry is eliminated through production acceleration over a planned period. The industry is thus given time to pick the most efficient and economical methods of expanding. It's no accident, then, that subcontracting is so heavily relied upon.

Subcontracting helps speed production because the burden of producing a myriad of complex parts is spread on many shoulders. It reduces the cost of new plants and facilities. It relieves the prime contractors (there are over 3000 of them) of some of the need for expansion of their own facilities, particularly for temporary needs. And subcontracting helps avoid overtaxing one plant or community by diverting work to plants and communities better able to handle the work.

**Opportunities, Challenges**—Defense philosophy is as much for broadening the base of production as it is for increasing production itself. Government pressure to bring additional firms into the defense traffic pattern via the subcontracting approach and the recognition of the value of subcontracting is good news to smaller metalworking firms. Because the peak of subcontracting is estimated to be 18 to 24 months away, many more thousands of subcontractors will still be needed.

Even though reports show opportunities in aircraft subcontracting to be golden-hued, the unglittering facts also show that subcontracting is not easy. Aircraft production has become increasingly specialized. There are vast differences between the supersonic jets of today and the 400-miles-per-hour piston-powered, propeller-driven airplanes of the last big war. Gages of metal are heavier. Airplanes, because of the terrific speed required, are rapidly becoming machined parts — with fewer and heavier parts. Precision machined parts for instance have replaced many of the sheet metal parts used on the planes of World War II. And a new, harder aluminum alloy, 75S, which requires heat-treating equipment often not needed half a decade ago, has come into general use.

**New Techniques, New Role**—Jet power and the evolution in electronics in transonic airplanes helped to bring about the new manufacturing techniques and a new role for the aircraft plant. Back in World War II to meet the goal of more and more aircraft, the industry concentrated on a more producible plane with lower production man-hours per unit. Essentially the airplane plant was an assembly plant—a huge control organization with hundreds of expediters. Thousands of small items were subcontracted to thousands of suppliers—just to achieve large scale production quickly. Douglas used 6000 to 8000, Lockheed 6000. Then subcontracting was sometimes more of a hindrance than a help: The parts subcontracted out were small and required elaborate production control, follow-up and checking. "It was an improvised scramble that gave little opportunity to pick and choose subcontractors," says Robert E. Gross, Lockheed's president.

**Present Accent**—The helter-skelter subcontracting of World War II has evolved into a planned program now. The accent being on research and development and less on mass production, prime contractors are subcontracting at the outset far more work than they did in World War II. The Aircraft Industries Association says already nearly 50 per cent of the dollar value of Air Force and Navy contracts goes to suppliers. Subcontracting is approaching—and in many cases exceeding—levels reached only late in World War II.

Lockheed is subcontracting 40 per cent of its dollar value of contracts to 4500 subcontractors and vendors compared to 18 per cent in the last war. Douglas is subcontracting 46.5 per cent against World War II's 55 per cent; Boeing 42 per cent against 49 per cent. Right now 93 companies in 33 states share in $124,700,000 worth of B-47 subcontracts farmed out of Boeing's Wichita Division.

Similarly, the amount of subcontracting by Boeing's Seattle Division is increasing. Today Boeing's Seattle plants are feeding C-97 and B-50 work to 190 subcontractors; 170 of them qualify as "small business."

Subcontract work for the Fairchild Aircraft Division is now double that of one year ago, and about the same as it was at the close of World War II. The percentage of work being subcontracted in dollar value will increase from 17 per cent to about 35 per cent in the coming years. Republic Aviation is subcontracting about 33 per cent of the Republic F-86E Thunderjet fighter-bomber and is aiming for 67 per cent.

North American Aviation, Inc. is buying $90 million worth of materials and parts yearly or spreading 40 per cent of its sales dollar among 4600 suppliers in 39 states. Consolidated Vultee is currently subcontracting from $120-$130 million or 33 per cent of its dollar volume against 30 to 40 per cent in World War II.

**Line of Flight**—World War II experience—the frantic rush to line up subcontractors—is not being repeated. Many prime contractors who will have the largest business to subcontract are just getting underway—the automotive plants, for example. Still further expansion of current subcontracting programs is definitely on its way. Lockheed will increase its list of 4500 subcontractors and vendors by 500 by the end of 1952 and Douglas needs 1,000 subcontractors added to its current 4000. Republic Aviation expects to add 900 subcontractors to hit its World War II peak, 2000.

The way the trend looks, subcontractors will be getting the largest share of the military aircraft production dollar—permanently.

## Big Business in Spare Parts

Boeing Airplane Co. has contracts for spare parts for which government funds were allotted for about $190 million, says George R. Sanborn, director of the spares division. The program includes spares for the B-47 jet bomber and piston-powered transport planes and bombers, but not for the large B-52 now under construction.

## Lockheed Tries Extrusion

Mass production of high-strength aircraft parts by impact extrusion of hard metals is underway at Lockheed Aircraft Corp., Burbank, Calif. Material and labor savings, according to Hall L. Hibbard, vice-president and chief engineer, are running as high as 75 per cent.

For two years Lockheed engineers studied how to accomplish impact extrusion of aluminum alloys. Experiments and actual production experience resulted in design of a 1000-ton impact extrusion punchpress being built by E. W. Bliss Co., Toledo, O. The press will produce parts measuring up to 12 square inches in cross section and 24 inches in length at the rate of 2 per minute with hand-feeding and 12 per minute with automatic feeding.

George W. Papen, Lockheed production engineer estimates that transfer of 15 small parts from conventional machining to impact extrusion forming will result in savings of more than $52,000 a year. Lockheed has found the process practical on runs of 1000 or more parts. Impact extrusions are said to be stronger than similar parts machined on a lathe or drill press from castings. Sharp impact causes cold working of the metal, with consequent increased tensile strength. Thinner-walled parts can be produced. Some parts can be made with only a quarter of the bulk metal previously used.

## Piston Engines To Be Modernized

Pratt & Whitney Division of United Aircraft Corp., East Hartford, Conn., is modernizing the R-4360 piston engine used by commercial airlines in Boeing Stratocruisers. The program will probably require an outlay of about $10 million. The airlines themselves will contribute labor to the modernization program, P & W supplying the kits or components.

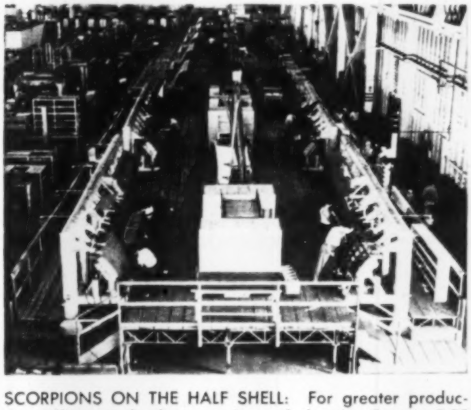
## Convair To Make Guided Missiles

Construction will start early in August on the Navy's integrated mass production plant for guided missiles. The new facility is to be operated at Pomona, Calif., by Consolidated Vultee Aircraft Corp.

Convair's Guided Missile Division, now located at San Diego, will supervise construction and operate the factory to build supersonic interceptor-type missiles for the Navy's Bureau of Ordnance.

## Ryan Adds $8 Million to Orders

Ryan Aeronautical Co. got $8 million in new orders for jet engine components in the first week of July says T. C. Ryan, president. The new business was placed by General Electric Co. and Wright Aeronautical Corp. and brings the company's backlog of unfilled orders to $40 million.



SCORPIONS ON THE HALF SHELL: For greater production efficiency fuselage sections of the Air Force's F-89 (Scorpion) interceptor are built in semicircular sections. The method enables many assemblers to work at each station at one time

IN ANY KIND OF WEATHER: The pressurized Scorpion is an all weather craft. Its twin jet engines are built by Allison Division of General Motors. Newest production models of the J-35 series, the J-35-A-29, has a thrust rating of 5400 pounds

**From Bumper to Tailgate . . .**

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The widespread use of N-A-X HIGH-TENSILE steel in transportation equipment emphasizes two vital characteristics of this high-strength low-alloy steel.

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The response of N-A-X HIGH-TENSILE steel to severe cold-forming operations and its excellent weldability by electric arc or resistance, atomic hydrogen or heliarc, and all other processes, are added important characteristics of N-A-X HIGH-TENSILE steel.

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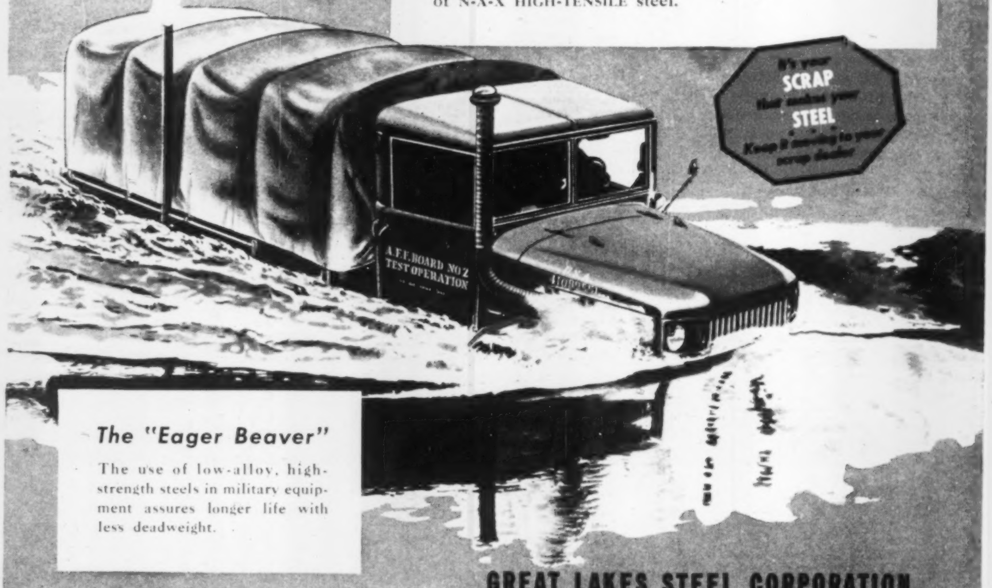

### The "Eager Beaver"

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**NATIONAL STEEL CORPORATION**

By H. C. TUTTLE *Detroit Editor*

# Mirrors of Motordom

**General Motors develops a new version of the 6 by 6 military truck of World War II. The major change is a Hydra-Matic shift with eight forward and two reverse speeds**

*DETROIT*

SUCCESSOR to the world-famed "Workhorse of the Army" has been developed by GMC Truck & Coach Division of General Motors. Officially designated as the M-135, the new 6 by 6 military truck has not been given a nickname by its originators. They are willing to let American G. I.'s give it a tag, and will be well satisfied if it becomes known only as the 6 by 6.

That is what happened to the previous GMC military truck that has six wheels all power-driven. Production during World War II of almost 600,000 of them made that truck, in combination with the jeep, a symbol to the world of mobility of the American fighting man.

**Tried and True**—GMC's truck, the division's engineers point out, contains little in the way of untried innovations. When the services buy a truck they are also buying dependability, and one of the most frequently heard gripes from people who have seen Korean action is that entirely too many of our vehicles had to be abandoned and destroyed when they broke down in the see-saw fighting.

Its most radical departure from previous military vehicles is that it contains a Hydra-Matic transmission. An automatic transmission has been high on the list of items which ordnance people want in military trucks. The device, it has been claimed, is responsible for one area of undeniable supremacy of our tanks over those of the Russians.

**A Child Could Operate**—The GMC Hydra-Matic has eight forward speeds and two reverse. It operates through two gear ranges—high and low—which the driver selects by use of a small lever located on a knee-high tower next to him. There is no clutch pedal, and the lever may be moved into the high or low ranges whenever desired. Speed of the truck is a governing factor and the speedometer face is painted to show at what speeds the shift can be accomplished.

Because of the simplicity of the shifting operation, when needed, and the automaticity of the device in picking its own gear ratio, driver training of the new truck is enormously simplified. A person having had some experience driving military trucks in the last war can't help marvel at the operation of this new one. An accomplished driver could be trained in a fraction of the time required for teaching a novice to operate a conventional truck gearshift. In less than ten minutes this writer was qualified to man-handle the truck over some roads in General Motors' proving ground over which he wouldn't (and probably couldn't) take his own car.

**Improvements** — Automatic front wheel drive engagement is another feature which the wartime 6 by 6 lacked. Another new design is in springing—a high mortality point of present military vehicles. The M-135 uses torque rod suspension for the front axle in combination with regular leaf springs. The torque rods relieve the springs of all driving and torsional effects, help maintain the position of the front axle and improve directional stability. One result is that the truck steers with not much more effort than is required for a large passenger car. Rear springing has also been improved. In load capacity the M-135 carries five tons, while towing another five. Its predecessor was rated at two and a half and two tons, respectively.

Powered by a new GMC 6-cylinder engine with displacement of 302 cubic inches, the truck develops 145 horsepower, 41 horsepower more than the 270 cubic inch engine used in the previous $2\frac{1}{2}$ tonner. It has a maximum speed of 58 miles per hour when fully loaded, compared with 45 miles per hour for the old 6 by 6.

**Waterproof** — A "Snorkel" device permitting the engine to breathe while the truck is in water up to the driver's neck is part of the equipment. Completely waterproofed, the engine can be started under water, and mechanical parts are encased with compressed air to keep water from entering them.

GMC's plant at Pontiac is being tooled to mass-produce the new truck. A \$140-million production contract with ordnance was booked some months ago.

## Hydra-Matics for Civilian Units?

The 6 by 6 presages at least one important change in the 1952 line of GMC commercial trucks. The lighter models, probably $\frac{1}{2}$, $\frac{3}{4}$ and 1-ton, will be equipped with standard Hydra-Matic transmissions. The beefed-up version, which appears in the M-135 will be available on larger models, according to hints dropped by GMC engineers.

When one was questioned as to whether fleet operators would be willing to sacrifice economy of operation for this feature, the answer was that the Hydra-Matic in trucks was proved to be at least as economical of fuel and in most cases more economical than the conventional shift, the ex-

GMC TRUCK & COACH DIVISION'S M-135

*. . . GM will be happy if it gets known as the 6 by 6*

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planation being that Hydra-Matic selects a new gear ratio at the exact moment it is needed. The transmission responds to the accelerator pedal and the demands on the engine much quicker than the operator could manually shift.

## Military Weekend for GMC

It was a military weekend for GMC people, beginning with the demonstration of the M-135 and climaxing with a public display at Walled Lake, near Pontiac, of what was claimed to have been the largest exhibit of its kind ever assembled in this country. On exhibit by the Navy was a cutaway torpedo and mines and guided missiles. The Army had tanks, artillery pieces, vehicles. The Air Force brought two jets, the experimental XF-85 which takes off and lands from a hook on the belly of a B-36, and an F-80, which was started periodically to the delight of the children and the devastation of the grass and trees for a hundred feet behind it. Cut-away jet engines were also featured.

## Gage Numbers On the Way Out

Changes in manufacturing and purchasing terminology for steel and other metals may result from Ford's departure from the conventional gage numbers when specifying steel thickness. The standard decimal system has now been adopted, and is expected by D. J. Davis, director of manufacturing engineering, to be extended to brass, copper, aluminum and other metal sheet and strip. No longer, for example, is body panel sheet referred to as 20-gage at Ford. It's 0.036-inch sheet.

"While gage systems solved the problem of specifying metal thickness in the early industrial era," says Mr. Davis, "they have outlived their usefulness in an age of precision manufacturing." Decimal measurements, he believes, will permit easier scheduling, reduced bookkeeping and inventories, more effective use of trimmings and lower materials handling costs.

## Three Make Defense Moves

Three new developments of military significance in the automotive industry have been announced:

Ford reveals it is negotiating contracts to supply B-47 wing sections to Boeing, Douglas and Lockheed. They will be built by the Ford Division in a million-square foot plant under construction in Claycomo, Mo. Designed originally as a car and truck assembly plant (foundation was already in place) the facility was changed to provide more headroom for Air Force work. About 5000 to 6000 people will be employed. Some 40 per cent of the basic components will be subcontracted.

## Auto, Truck Output

U. S. and Canada

|  | 1951 | 1950 |
|---|---|---|
| January | 645,688 | 609,878 |
| February | 658,918 | 505,593 |
| March | 802,737 | 610,680 |
| April | 680,216 | 585,705 |
| May | 696,039 | 732,161 |
| June | 652,788* | 897,853 |
| July |  | 746,801 |
| August |  | 842,335 |
| September |  | 760,847 |
| October |  | 796,010 |
| November |  | 633,874 |
| December |  | 671,622 |

| Week Ended | 1951 | 1950 |
|---|---|---|
| June 30 | 156,105 | 197,767 |
| July 7 | 98,087 | 137,731 |
| July 14 | 117,838 | 194,073 |
| July 21 | 130,000* | 187,339 |

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary

Packard will quadruple the size of its forge operations through purchase of the former R. C. Mahon Co. property a half mile north of its present forge shop. Price was approximately $2 million for the 327,000-square foot plant. Installation of $11 million worth of forging equipment will begin as soon as Packard takes over Sept. 1. The expansion ties in closely with Packard's defense production and will be of "key importance," President Hugh Ferry states.

Chevrolet is moving toward higher production of shells at the St. Louis plant it took over in April. A standby plant that Chevrolet had operated during the last war, it was producing ammunition 62 days after the automaker moved in.

## GM Explains Employment

One of the enigmas in the employment-production situation of the auto industry has been General Motors. While other car makers cut into their work forces in varying depths, GM went along, showing little surface reaction to government orders that restricted output. Some insiders thought that after resuming from the shutdown July 28 to Aug. 6 of many plants of the corporation, there would be somewhat fewer familiar faces around. GM's silence on the matter didn't ease the apprehension. All concerned breathed a sigh of relief when the official pronouncement came. Maybe there is in GM's handling of their situation a partial answer to be found for the reason it is troubled less with labor unrest than most other large organizations.

Back in 1950, with demand for its products strong, the natural inclination would have been to add to the payroll. "We elected to work a great deal of overtime" instead, reads the official statement. Came the 10 per cent production cut in first quarter and 20 per cent in second and "Relatively few employees were laid off because we were able to take up the slack through the elimination of most overtime on civilian work and by not replacing many employees who entered the Armed Forces or left our employment."

Faced with third quarter tighter restrictions, the decision was reached to schedule a relatively short layoff in the vacation season and try to maintain 40-hour work-weeks through the rest of the quarter. The present organization it is hoped, can be maintained if employees get 5 to 8 working days off during the quarter. Not all plants are affected identically, and it may be necessary at the end of July to let go "a relatively few short-time employees."

No important reductions are anticipated at General Motors in the fourth quarter.

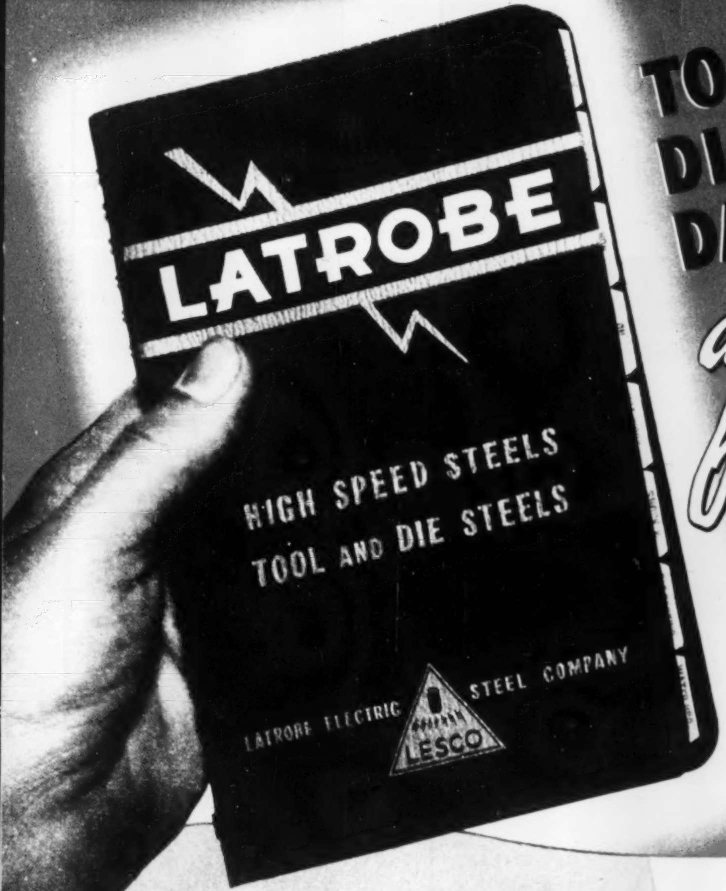
## Ford Boosts Scientist

The man responsible for Ford's development of isotope gages for measuring the level of molten iron in foundry cupolas and for recording the thickness of sheet steel in the cold rolling mill has been named manager of the physics department of the company's new scientific laboratory Don M. McCutcheon, until this appointment, directed the activities of the applied physics unit of Ford's Manufacturing Research Dept.

## Olds Has the Time

Lest it appear that Detroit's only interest is in military matters, a little item from Oldsmobile will set you right again. Now available as optional equipment on 1951 models is a 15-jewel car watch, mounted in the steering wheel, movement of which keeps the watch wound. Developed by a Zurich, Switzerland man, the watch is said to keep precise time.

One of its unusual features is a red arrow on the face which can be set when departing on a trip, and the elapsed time easily checked upon arrival.



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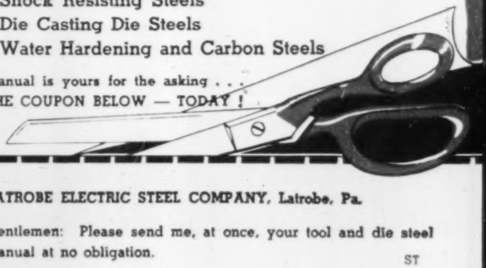

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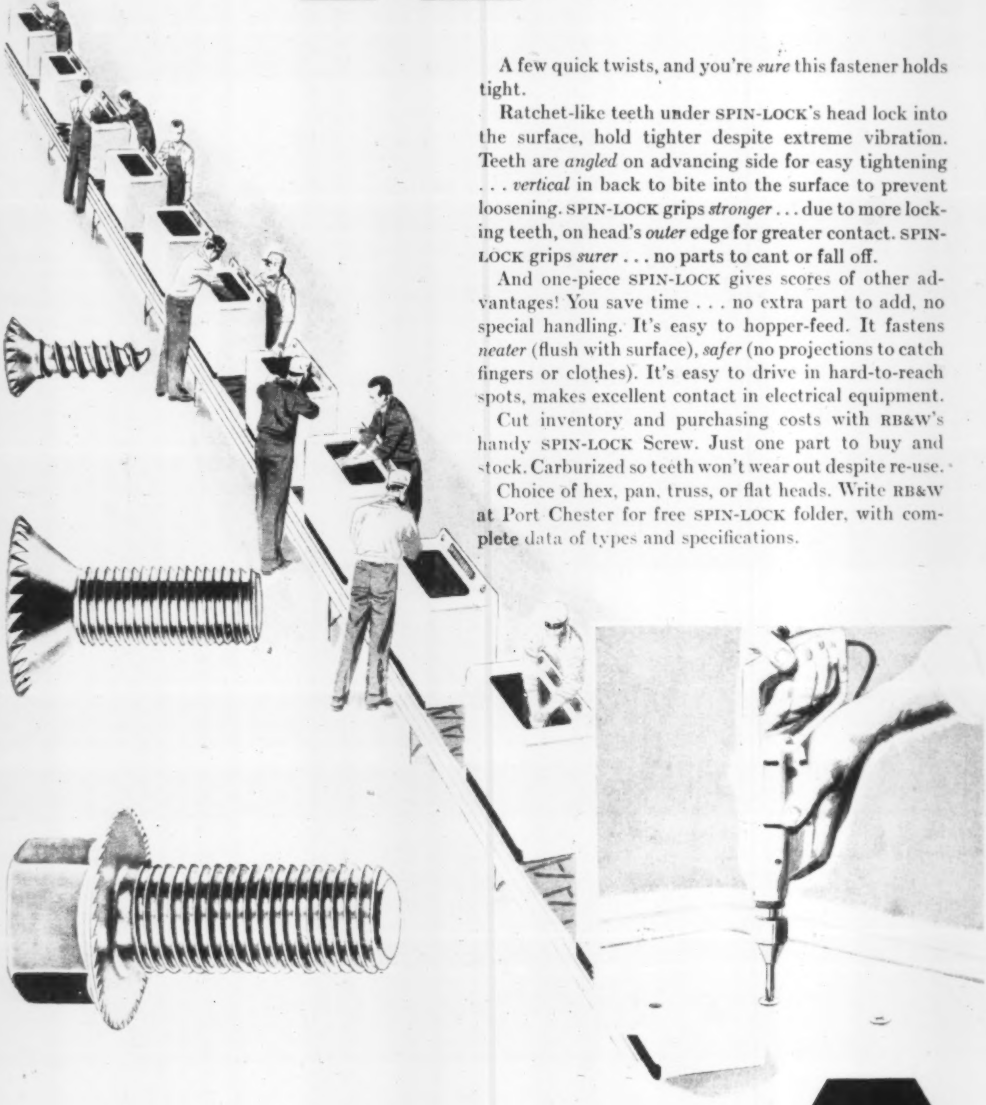

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# The Business Trend

**High inventories are causing jitters as signs of psychological letdown from truce are seen. Activity index climbs back up from lowest mark in a year**

SIGNPOSTS of a business slowdown are showing on the economic roadmap as the gap between truce talks and armistice widens. A slight psychological letdown from the idea of truce is already apparent; prolongation of negotiations is causing suspension of action and decision until signals on speed and direction of arming are again given. In Washington there is a legislative block in passage of the Defense Production Act while Congress reads the bill in light of recent and probable future events. The administration has made known its determination to keep up a flow of weapons for the nation to defend itself. But legislators, with perhaps an ear to the political ground, are taking their time in rewriting the bill. Taxes, controls and budget—important guides for a businessman plotting his future course—are still up in the air.

Inventory totals are also causing a jangling of nerves in the business world. They were up over $15 billion in the year since Korea—and the advance is continuing. Dollar value increased about 30 per cent in that period while sales gained by only about 9 per cent. Manufacturers' and retailers' stocks were up $1 billion each in the month, while wholesalers added only about one-third of that amount. Significant is that not much of the boost in inventory value was caused by price increases. Since February, when serious price rises stopped, about $1.3 billion has been added to inventories per month. Truce makes inventories look even bigger, and any downward price movement will make liquidation costly. Businessmen are hoping that rising employment—61.8 million were employed in June from a labor force of 63.8 million—and sturdier personal income will help shake some dust off stocks on the shelves.

On the bright side of the business picture are several bulwarks that should keep the economy well shored. One is the $4 billion a month clip in arms orders that is due for an upward turn. Another is the go-ahead being given to business expansion that will drop nearly $25 million in the economic lap. And a faint gleam of hope is being seen that consumers are snapping out of their buying lethargy.

From the production angle, arms output in now about $1.5 billion a month and rising steadily. It should pick up the slack caused by civilian shutdowns plus about $1 billion-per-month more for the rest of the year. Federal Reserve Board's advance estimate of industrial production in June held at the record peacetime level of 223 per cent of the 1935-1939 average for the third consecutive month. STEEL's weekly industrial activity index for the period ended July 14 was set at 207 per cent of the 1936-1939 average. This was not back to the norm of recent months but represents quite a climb from the revised mark of the previous holiday week when the index skidded to 186, lowest mark in a year.

## Steel Output Creeps Up . . .

Vital to war or peace production is steel, which is unrelenting in its output torrent. American Iron & Steel Institute expected it to flow a little faster in the week ended

B A R O M E T E R S o f B U S I N E S S

| | | LATEST PERIOD* | PRIOR WEEK | MONTH AGO | YEAR AGO |
|---|---|---|---|---|---|
| INDUSTRY | Steel Ingot Output (per cent of capacity)† | 101.5 | 101.0 | 103.0 | 95.0 |
| | Electric Power Distributed (million kilowatt hours) | 6,739 | 6,077 | 6,747 | 6,006 |
| | Bituminous Coal Production (daily av.—1000 tons) | 235 | 1,760 | 1,654 | 266 |
| | Petroleum Production (daily av.—1000 bbl) | 6,171 | 6,169 | 6,189 | 5,495 |
| | Construction Volume (ENR—Unit $1,000,000) | $364.0 | $404.7 | $206.9 | $365.0 |
| | Automobile and Truck Output (Ward's—number units) | 117,838 | 98,087 | 157,026 | 194,073 |

*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.

| | | LATEST PERIOD* | PRIOR WEEK | MONTH AGO | YEAR AGO |
|---|---|---|---|---|---|
| TRADE | Freight Car Loadings (unit—1000 cars) | 830† | 588 | 826 | 789 |
| | Business Failures (Dun & Bradstreet, number) | 173 | 129 | 130 | 187 |
| | Currency in Circulation (in millions of dollars)‡ | $27,893 | $27,948 | $27,499 | $27,169 |
| | Department Store Sales (changes from like wk. a yr. ago)‡ | +1% | −2% | +3% | +8% |

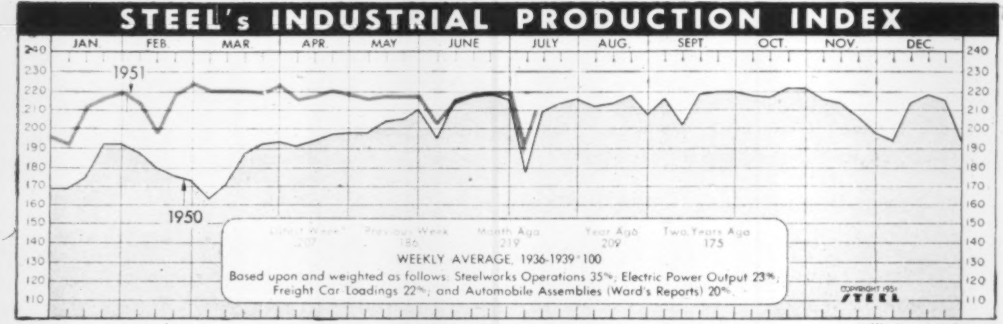
†Preliminary. ‡Federal Reserve Board.

| | | LATEST PERIOD* | PRIOR WEEK | MONTH AGO | YEAR AGO |
|---|---|---|---|---|---|
| FINANCE | Bank Clearings (Dun & Bradstreet—millions) | $15,985 | $14,738 | $15,066 | $14,372 |
| | Federal Gross Debt (billions) | $254.7 | $254.7 | $254.6 | $257.2 |
| | Bond Volume, NYSE (millions) | $12.3 | $10.2 | $13.3 | $29.9 |
| | Stocks Sales, NYSE (thousands of shares) | 5,441 | 5,183 | 6,165 | 12,961 |
| | Loans and Investments (billions)† | $70.2 | $70.6 | $69.0 | $67.6 |
| | United States Gov't. Obligations Held (millions)† | $30,785 | $31,176 | $30,207 | $36,152 |

†Member banks, Federal Reserve System.

| | | LATEST PERIOD* | PRIOR WEEK | MONTH AGO | YEAR AGO |
|---|---|---|---|---|---|
| PRICES | STEEL's Weighted Finished Steel Price Index†† | 171.92 | 171.92 | 171.92 | 156.69 |
| | STEEL's Nonferrous Metal Price Index‡ | 226.0 | 226.0 | 232.7 | 190.1 |
| | All Commodities† | 179.7 | 180.2 | 181.7 | 163.0 |
| | Metals and Metal Products† | 188.2 | 188.2 | 189.0 | 172.3 |

†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.



WEEKLY AVERAGE, 1936-1939=100

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

* Week ended July 14

July 21. Operations were scheduled to produce 2,037,000 tons of ingots and steel for castings, a gain of 8000 tons from the preceding period, and nearly 2 per cent over capacity.

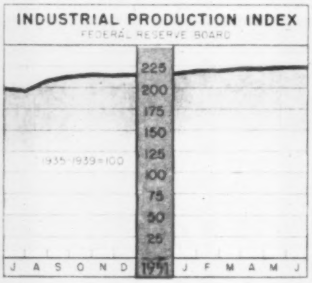
## Auto Assemblies Crippled . . .

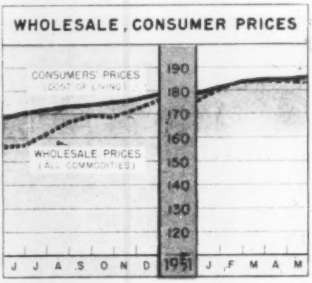
Hit from every angle by some crippling blow, automakers are rubbing their bruises and looking over a miserable two-week production record. Though U. S.-Canadian assemblies in the week ended July 14 rebounded to 117,838 from the 4-day mark of 98,087 of the prior week, it was the lowest 5-day assembly total since the rail strike in February. Cutbacks in output, says *Ward's Automotive Reports*, call for stepped-up efficiency if operations are to be profitable. Workers at several plants are rebelling against alleged speed-ups. *Ward's* says June auto sales equaled or exceeded output for nearly all producers and that there is dealer pressure for more cars on almost every side.

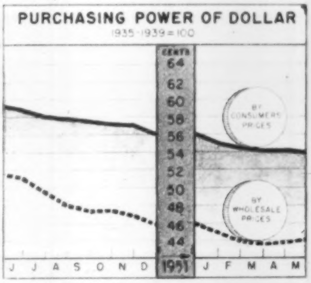
## Fewer Private Home Starts . . .

Homebuilders started 87,700 new private dwelling houses in June, says the Department of Labor. This represents a 7 per cent drop from the 93,800 private dwellings begun in May. But the Public Housing Administration's authorization for 42,000 public units brought the total number of units started in June to 130,000, well above May's 97,000 units and near to the 144,300 of June, 1950. The flood of public units was caused by the rush to get projects under way before the end of the fiscal year.

First-half construction awards in the 37 states east of the Rockies were valued at a record $8.8 billion by F. W. Dodge Corp. The new figure—29 per cent greater than the nearest comparative total set during the first half of 1950—was chalked up despite a drop in June of 45 per cent from May's all-time monthly record total of contracts awarded. June saw $1,408,-







### Industrial Production Index

| | Total Production | | Iron, Steel | | Non-ferrous | |
|---|---|---|---|---|---|---|
| | 1951 | 1950 | 1951 | 1950 | 1951 | 1950 |
| Jan. | 221 | 183 | 255 | 203 | 224 | 180 |
| Feb. | 221 | 180 | 252 | 201 | 218 | 190 |
| Mar. | 222 | 187 | 263 | 205 | 212 | 200 |
| Apr. | 223 | 190 | 264 | 222 | 213 | 198 |
| May | 223 | 195 | 263 | 226 | 213 | 197 |
| June | 223 | 199 | ... | 231 | ... | 207 |
| July | ... | 196 | ... | 228 | ... | 202 |
| Aug. | | 209 | | 236 | | 212 |
| Sept. | | 211 | | 245 | | 216 |
| Oct. | | 216 | | 253 | | 223 |
| Nov. | | 214 | | 247 | | 227 |
| Dec. | | 217 | | 253 | | 227 |
| Avg. | | 200 | | 229 | | 207 |

Federal Reserve Board

### Price Indexes

| | Wholesale (1926=100) | | Consumers (1935-39=100) | |
|---|---|---|---|---|
| | 1951 | 1950 | 1951 | 1950 |
| Jan. | 180.1 | 151.5 | 181.5 | 168.2 |
| Feb. | 183.6 | 152.7 | 183.8 | 167.9 |
| Mar. | 184.0 | 152.7 | 184.5 | 168.4 |
| Apr. | 183.5 | 152.9 | 184.6 | 168.5 |
| May | 182.8 | 155.9 | 185.4 | 169.3 |
| June | | 157.3 | ... | 170.2 |
| July | | 162.9 | ... | 172.0 |
| Aug. | | 166.4 | | 173.4 |
| Sept. | | 169.5 | | 174.6 |
| Oct. | | 169.1 | | 175.6 |
| Nov. | | 171.7 | | 176.4 |
| Dec. | | 175.3 | | 178.8 |

U. S. Bureau of Labor Statistics

### Purchasing Power of the Dollar

Cents, as measured by:

| | Wholesale Prices | | Consumers' Prices | |
|---|---|---|---|---|
| | 1951 | 1950 | 1951 | 1950 |
| Jan. | 44.6 | 53.1 | 55.1 | 59.5 |
| Feb. | 43.8 | 52.7 | 54.4 | 59.6 |
| Mar. | 43.7 | 52.7 | 54.2 | [illegible] |
| Apr. | 43.8 | 52.6 | 54.2 | 59.3 |
| May | 44.1 | 51.6 | 53.9 | 59.1 |
| June | | 51.2 | | 58.8 |
| July | | 49.4 | | 58.1 |
| Aug. | | 48.3 | | 57.7 |
| Sept. | | 47.5 | | 57.3 |
| Oct. | | 47.5 | | 56.9 |
| Nov. | | 46.8 | | 56.7 |
| Dec. | | 45.8 | | 55.9 |

U. S. Office of Business Economics

Charts—Copyright 1951, STEEL

932,000 in contracts awarded. All categories were ahead of 1950, but residential classifications began to show earmarks of defense-limited construction. Weekly awards, reported by *Engineering News-Record,* totaled $361 million in the 4 days ending July 12.

## Prices Continue Ease-Off . . .

Another slide in wholesale prices—the sixth consecutive weekly drop—occurred in the week ended July 10. The Bureau of Labor Statistics index of average primary market prices dipped 0.5 percentage points to 179.7 per cent of the 1926 average. The index is almost 1 per cent below the mark of the pre-GCPR date, January 23, 1951. All major groups declined except metals and metals products which held steady at 188.2.

## Miners Back To Work . . .

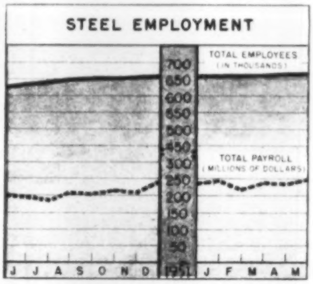
Showing how well organized the coal miners are is production of soft coal in the week ended July 7: 1,410,000 net tons. This is the week in which the organized miners took their contract-specified miners' holiday. Output was just about 12 per cent of normal. Miners are now at work again, but not on full schedule as stocks are at an 8-year high.

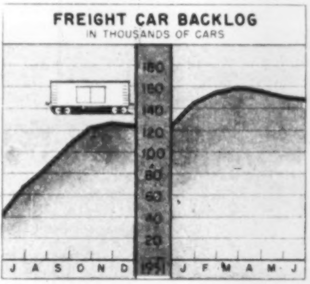
## Trends Fore and Aft . . .

Food prices rose approximately one-half of one per cent during the last half of June . . . The dollar spent by manufacturers for factory labor is currently worth only about 40 cents on the basis of the 1939 dollar, says the National Industrial Conference Board. For industrial raw materials, it's worth only 31 cents. On the other hand, dollars spent for capital funds and electricity have gone up in value since 1939 . . . Second-quarter shipments of domestic gas ranges were 27 per cent below the same period of 1950 . . . Stromberg Carlson Co. will resume TV receiver production after being almost completely down since April . . . General Motors plans to build 37 per cent fewer cars in the third quarter than in last year's same period.

**Issue Dates of Other FACTS and FIGURES Published by STEEL:**

| | |
|---|---|
| Construction | June25 |
| Durable Goods | July2 |
| Employ., Metalwkg. | July16 |
| Fab. Struc. Steel | June4 |
| Foundry Equip. | July16 |
| Furnaces, Indus. | July2 |
| Furnaces, W. Air | May28 |
| Gear Sales | July9 |
| Gray Iron Castings | July9 |
| Ironers | July16 |
| Machine Tools | July2 |
| Malleable Castings | July9 |
| Pumps, New Orders | July9 |
| Radio, TV | July16 |
| Ranges, Elec. | June11 |
| Ranges, Gas | June4 |
| Refrigerators | June18 |
| Steel Castings | July9 |
| Steel Forgings | July2 |
| Steel Shipments | July2 |
| Vacuum Cleaners | June4 |
| Wages, Metalwkg. | June18 |
| Washers | July16 |
| Water Heaters | June25 |





### Steel Employment, Payrolls

| | Employees† in Thousands | | Payrolls in Millions | |
|---|---|---|---|---|
| | 1951 | 1950 | 1951 | 1950 |
| Jan. | 657 | 609 | $245.3 | $189.3 |
| Feb. | 663 | 613 | 219.4 | 174.7 |
| Mar. | 663 | 616 | 238.3 | 190.0 |
| Apr. | 666 | 621 | 234.8 | 186.2 |
| May | 667 | 628 | 249.0 | 199.9 |
| June | .... | 636 | .... | 195.3 |
| July | .... | 643 | .... | 188.7 |
| Aug. | .... | 649 | .... | 206.6 |
| Sept. | .... | 650 | .... | 203.8 |
| Oct. | .... | 650 | .... | 212.2 |
| Nov. | .... | 653 | .... | 208.0 |
| Dec. | .... | 657 | .... | 235.0 |

† Monthly average. American Iron & Steel Institute

### Freight Car Awards and Backlogs

| | Awards | | Backlogs* | |
|---|---|---|---|---|
| | 1951 | 1950 | 1951 | 1950 |
| Jan. | 26,356 | 9,376 | 144,758 | 19,026 |
| Feb. | 15,947 | 9,065 | 154,861 | 26,055 |
| Mar. | 11,271 | 6,201 | 158,619 | 30,539 |
| Apr. | 6,628 | 3,298 | 155,871 | 32,857 |
| May | 4,919 | 11,636 | 150,628 | 42,300 |
| June | 6,793 | 2,095 | 147,725 | 40,585 |
| July | ...... | 30,065 | ...... | 67,084 |
| Aug. | ...... | 23,850 | ...... | 86,156 |
| Sept. | ...... | 25,111 | ...... | 106,611 |
| Oct. | ...... | 21,886 | ...... | 122,148 |
| Nov. | ...... | 10,573 | ...... | 126,870 |
| Dec. | ...... | 3,326 | ...... | 124,489 |
| Total | | 156,482 | ...... | |

* End of month

American Railway Car Institute

*Be Sure! . . . Use*

**HOUGHTON**
**HI-TEMP**
**OILS**

| | |
|---|---|
| No. 101 | from 300° F. to 400° F. |
| No. 102 | from 400° F. to 450° F. |
| No. 103 | from 450° F. to 500° F. |
| No. 227 | from 300° F. to 450° F. |
| No. 237 | from 450° F. to 500° F. |
| No. 302 | from 500° F. and Over. |

*for your "hot spot" lubrication needs!*

**REMOVE GUESSWORK!**

Houghton's series of Hi-Temp Oils give you a safe, sure choice of hot spot lubricants. No guessing. Each is designed for particular operating temperature ranges to over 500° F., based on more than 300 actual operating tests.

**REDUCE DOWNTIME!**

Hi-Temp's clean, dependable lubrication keeps production going. Costly downtime due to inadequate lubrication is no problem to Hi-Temp users.

**CUT MAINTENANCE COSTS!**

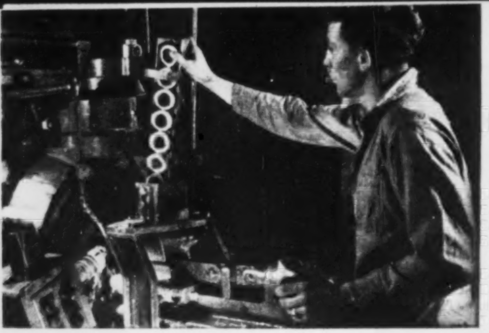
Pick the *right* Hi-Temp Oil for any lubrication job and it will out-last, out-perform ordinary oils.

**Write for latest Hi-Temp Bulletin, to E. F. Houghton & Co., Philadelphia 33, Pa.**

HI-TEMP OILS
. . . products of

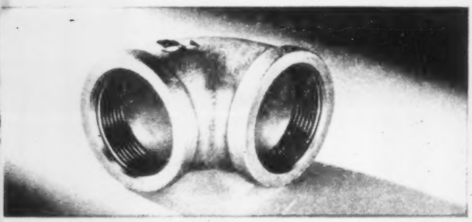
E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .



**A PIPE FITTING MANUFACTURER** had trouble with a straight cutting oil. It made the floors slippery; was suspected of causing skin irritations; discolored the fittings. In addition, a special cleaner and rust preventive had to be used.

**CHANGING TO S.E.C.O.** brought excellent results. This "Job Proved" emulsifying cutting oil kept the fittings from discoloring, minimized complaints about skin troubles, made floors safe, eliminated the need for a special cleaner and rust preventive.



**OPERATIONAL DATA.** Machine: 2″ automatic tapping machine • Metal: Malleable iron • Operation: Thread and chamfer 1½″ 45° elbow • Cutting Speed: 75 SFM • Tools: High speed • Production: 306 pieces per hour • Cycle Time: 11¾ sec.

# S.E.C.O. REPLACES THREE PRODUCTS; REDUCES COSTS, MAKES SHOP CLEANER, SAFER

Ten years ago, one of the largest manufacturers of pipe fittings was using a straight cutting oil that proved to be a production headache. It made floors slippery, discolored the fittings, even was blamed by the operators for causing skin ailments.

The company overcame these problems—with extra benefits for good measure—by changing to Sunoco Emulsifying Cutting Oil. S.E.C.O. performed as a quality cutting oil is expected to, and eliminated the need for two costly supplementary products: a special alkali cleaner and a rust preventive. Sprayed on the parts conveyed through the washers, S.E.C.O. left a film that gave complete protection against rusting. Oil costs were reduced to an amazing extent; floors were safe; complaints about skin irritations were minimized and shop morale improved. The pipe fittings, free of discoloration, commanded a better position saleswise. The company standardized on S.E.C.O. and has been using it ever since.

In all machine shop operations, on both ferrous and nonferrous metals, Sun Emulsifying Cutting Oil is definitely superior. That's why more S.E.C.O. is used than all other brands of emulsifying cutting oil combined. For more operational data on typical S.E.C.O. applications, write for a copy of the new "Cutting and Grinding Facts." Department S-7.

**SUN INDUSTRIAL PRODUCTS**

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO ®

# Men of Industry

JOHN P. KADLIC

. . . sales mgr., div., Roebling's Sons

R. W. THOMPSON

. . . president, Interlake Iron

JAMES D. WHITE JR.

. . . V. P. and gen. mgr., Darwin & Milner

**John P. Kadlic** has been appointed Philadelphia district sales manager for the wire rope division of **John A. Roebling's Sons Co.,** Trenton, N. J.

Newly elected officers of the **Allied Steel Castings Co.,** Chicago, are **J. T. Llewellyn II,** president and **L. J. Wise,** vice president. **L. F. Hartwig** will assume the title of assistant to the president. Mr. Hartwig has also been elected vice president-manufacturing of the **Chicago Malleable Castings Co.,** Chicago.

**John E. Brennan,** who was chief production engineer of the Dodge Chicago Aircraft Engine Plant during World War II, has been appointed general manager of the **Chrysler Jet Engine Plant,** Trenton, Mich., which will be under the direction and supervision of the Dodge Div. of Chrysler Corp.

JOHN E. BRENNAN

. . . heads jet engine plant

**R. W. Thompson,** vice president of **Interlake Iron Corp.,** Cleveland, was elected president and a director and member of the executive committee.

**W. Clifford Mumford** has been appointed manager of the vertical turbine pump sales division of the **Worthington Pump & Machinery Corp.,** Harrison, N. J.

**John L. Heinlein** was appointed manager of manufacturing for the Central Div. of **Continental Can Co.,** New York, effective July 1. Mr. Heinlein formerly was plant manager for Continental plants in St. Louis and East St. Louis, Ill.

**Robert E. Huthsteiner** was elected president of **Cummins Engine Co. Inc.** in Columbus, Ind. Mr. Huthsteiner succeeds **J. Irwin Miller,** who becomes chairman of the board of directors.

Manager of the new **Twinfuel Div.** of the Norman Products Co., Columbus, O., is **James E. Humphreys,** formerly business promotion manager of the **Ohio Fuel Gas Co.,** Columbus.

**D. R. Shoults,** currently director of engineering for **Aro Inc.** of St. Louis, has been appointed director of the **General Electric Co.'s** Aircraft Nuclear Propulsion project for the Air Force and Atomic Energy Commission at Lockland, O.

**Frederick B. Hermann,** assistant director of the **Technical Development Dept.** of The Diversey Corp., Chicago, has been named director. Mr. Hermann succeeds **R. J. Stell,** named assistant to general sales manager.

**James D. White Jr.** was elected vice president and general manager of **Darwin & Milner Inc.,** Cleveland. Mr. White was formerly sales manager for the Milwaukee district of Crucible Steel Co. **Ralph A. Williams,** formerly a salesman with Darwin & Milner, recently returned as assistant general manager.

**John E. Renner** has been appointed general sales manager of the **Lincoln Engineering Co.,** St. Louis.

**Byron Stoothoff** has been appointed division manager in Div. 600 of the **Cleco Div.** of the Reed Roller Bit Co., Houston, with headquarters in Cincinnati.

**John G. Murray** has been appointed general manager of **Bond Crown & Cork Co.,** a subsidiary of Continental Can Co. Mr. Murray, formerly man-

JOHN G. MURRAY

. . . heads Continental subsidiary

ager of manufacturing for Continental's Central Div., will have his new headquarters in Wilmington, Del.

Vice president in charge of research of **McDonnell & Miller Inc.**, Chicago, is now John W. James.

**Joseph H. Treanor** has been elected president of **New England Coke Co.**, Boston, and a vice president of **Eastern Gas & Fuel Associates. R. M. Folsom,** former president of New England Coke, has been made chairman of the board of directors.

**Charles M. Freeman** has been appointed representative for the **Lapham-Hickey Co.**, Chicago, in Western Michigan and northern Indiana. Mr. Freeman is replacing **Capt. W. J. Collins** who has been recalled by the Army and is now stationed at the Air Materiel Command at Dayton, O.

**Harry Nowicki** has been appointed district manager of the Eastern-Texas Div., of **Ampco Metal Inc.** with headquarters at Houston. He was formerly a field engineer in the Chicago district office.

**A. T. Chandonnet** has been appointed manager of **General Electric Co.'s** Lynn, Mass., Turbine Div. Since 1947 Mr. Chandonnet has been assistant to the vice-president in charge of manufacturing policy.

**William V. O'Brien,** a commercial vice president of **General Electric Co.**, Schenectady, N. Y., has been appointed manager of the firm's Apparatus Marketing Div., succeeding **Chester H. Lang**, vice president.

**R. C. Neal Co. Inc.**, Buffalo, announces the election of the following new directors: **Allen H. Gardner**, president of the Niagara Searchlight Corp., Niagara Falls, N. Y., **Arthur J. Rau**, vice president of the Marine Trust Co. of Western New York; and **Byron B. Cushman,** manager of Neal's Rochester office.

**R. H. Sonneborn,** secretary and general manager of sales of **Chicago Nipple Mfg. Co.,** Chicago, has been elected vice president in charge of sales.

**F. S. Holway** has been appointed sales manager for **Mystic Iron Works**, Boston. He succeeds H. T. Outwater who retired.

**F. T. Sagemiller** has been named assistant to **William C. Krecklow,** production control manager of **Allis-Chalmers** general machinery division at the West Allis Works, Milwaukee.

WILLIAM J. FLEMING
*Worthington Div. mgr.*

E. A. MURRAY
*Worthington Div. mgr.*

**Worthington Pump and Machinery Corp.**, Buffalo, has appointed **William J. Fleming** manager of the **Construction Equipment Sales Div.** and **E. A. Murray** manager of the **Compressor Div.** Mr. Murray succeeds **Herman H. Miller,** who has relinquished the position to act as consultant to his successor.

**John W. Dixon** has been made executive vice president of the **Cleveland Graphite Bronze Co.,** Cleveland. Mr. Dixon has been vice president and treasurer.

**Walter H. Andrews** was elected president, **Chase Steel & Supply Co.,** Los Angeles. Other new officers are: **Lyn M. Edgerton,** first vice president and secretary; **Harry M. Stoner,** second vice president; **Howard N. Coulter**, treasurer.

Four new appointments in **General Electric Co.'s** fractional horsepower motor engineering divisions at Ft. Wayne, Ind., are: **J. Herbert Behm,** assistant to the manager of engineering on special assignments; **Lee R. Beard,** division engineer of the A-C motor engineering div.; **Ray D. Jones**, division engineer of the development engineering div.; and **I. E. Ross,** division engineer of the D-C and specialty motor engineering div.

**Earl J. Breech,** vice president in charge of sales, Merz Engineering Co., Indianapolis, has organized the **Automotive Engineering Service** with offices in Detroit, Chicago, Indianapolis, merchandising tools and engineering service to the auto industry. Associates are **Harry Westland,** formerly assistant to the president of Merz, and **Sam Miniea,** formerly Indianapolis sales manager of the Firth-Sterling Steel Co., McKeesport, Pa.

**Robert K. Follansbee,** vice president in charge of sales of **Follansbee Steel Corp.,** Pittsburgh, was elected to succeed his father, **John Follansbee,** retired, as a member of the board of directors of the corporation.

**Dr. Louis T. Rader** has been appointed manager of engineering of **General Electric Co.'s** Control Divisions at Schenectady, N. Y.

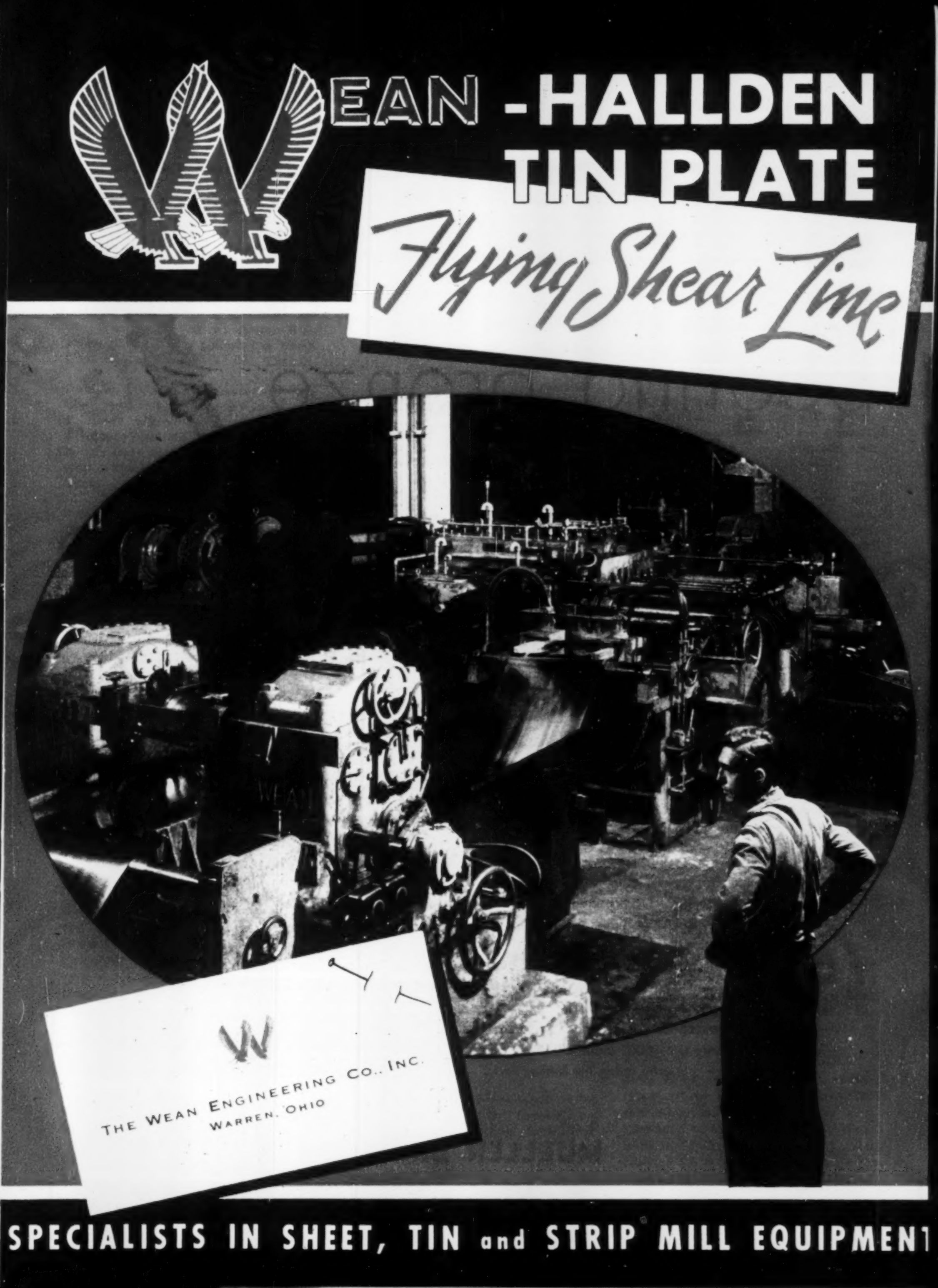
The following are three personnel moves which have been made in the **Electro-Motive Div.** of General Motors: **C. L. Moss,** formerly sales representative, Washington, D. C., to district sales manager, New York; **James B. Swindell,** from sales representative to district sales manager, Chicago. **Warren A. Thomas,** formerly manager of statistics and market analysis section in the sales department, to sales manager, LaGrange, Ill., factory branch.

**Ruben A. Redard** has been appointed purchasing agent of the **Keystone Steel & Wire Co.,** Peoria, Ill., succeeding **Frank A. Little** who was promoted to director of purchases.

**William A. Barnes** has been elected vice president of the **Utica Drop Forge & Tool Co.,** Utica, N. Y. He has been chief engineer at the plant since 1943.

**Robert J. Kane** has been retained by the **Cleveland-Cliffs Iron Co.** as a buyer in its Cleveland office Purchasing Dept. Mr. Kane was formerly with the **F. C. Russell Co.,** Cleveland.

Three new appointments made at the **American Car & Foundry Co.** are: **William M. Hawkins,** senior research engineer at the New York research and development department. **George Reed,** manager, general laboratories, at the Berwick, Pa., plant; and



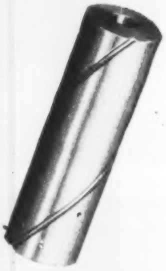
# WEAN-HALLDEN TIN PLATE *Flying Shear Line*

THE WEAN ENGINEERING CO., INC.
WARREN, OHIO

SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMENT

# MUELLER BRASS CO.

# 600 series a better bearing bronze containing no hard-to-get tin



If you use gears, connecting rods or other parts of bearing metal in your products, it will pay you to investigate Mueller Brass Co. "600" series, a forgeable bronze that contains no critical tin. This bearing metal outperforms phosphor bronze and other bearing metals and will save you money in your applications. "600" series bearing metal can be forged into relatively complicated shapes and produces a forging of close-grained homogeneous structure impossible to get in a casting. The forged shape is closer to finished size than a casting and requires less machining. "600" series alloys have a low coefficient of friction, a tensile strength 2½ times greater than cast phosphor bronzes and a high resistance to corrosion. "600" has a 25 year record of outstanding performance on some of the toughest bearing applications. There is a "600" series alloy with the properties to fit your bearing metal needs . . . write today for further facts.

*Four typical parts forged from Mueller Brass Co. "600" series Bearing Bronze.*

**MUELLER BRASS CO.**

PORT HURON 19, MICHIGAN

**Sheldon Thomas**, manager of inspection at Berwick.

**Rodger J. Mueller** has been appointed manager of the Youngstown, O., office of the **Falk Corp.**, Milwaukee.

**Warden F. Wilson**, general sales manager, **Lebanon Steel Foundry**, Lebanon, Pa., was elected president of the Alloy Casting Institute, the national technical organization of principal manufacturers of high alloy castings for heat, corrosion-resistant service.

**W. H. Maxwell** has been appointed assistant to the vice president for the Washington office of the **Wolverine Tube Div.** of Calumet & Hecla Consolidated Copper Co. Inc., Detroit.

**Dale G. O'Roke**, treasurer of the Champion Forge Co., Cleveland, and **T. Ames Wheeler**, controller of the Allegheny Ludlum Steel Corp., Pittsburgh, have been elected to membership in the **Controllers Institute**, New York.

**John E. O'Neil** has been appointed New England sales representative for the **White Metal Mfg. Co.**, Hoboken, N. J., succeeding Noble James. Headquarters are in Medford, Mass.

**Frank E. Wartgow** has joined the foundry engineering dept., aircraft engine division, **Ford Motor Co.**, Chicago, as process engineer. Mr. Wartgow has been production manager, **Howard Foundry Co.**, Chicago.

GEORGE A. INGALLS

*. . . a V. P., AMF Co.*

FRANK R. PLUM

*. . . V. P. and gen. mgr., AMF Div.*

**George A. Ingalls**, a director and comptroller of the **American Machine and Foundry Company**, New York, has been elected a vice president. **Frank R. Plum** has been named divisional vice president and general manager of the company's bakery division.

Superintendents of two jet engine manufacturing plants now under construction at **Buick Motor Div.**, Flint, Mich., will be **Robert Irwin** and **John F. Kennedy**.

**Berwick C. Barton** has been appointed superintendent of seamless tube mill at the Chicago District of **Republic Steel Corp.**

**J. L. Fechter** was named assistant division manager, San Diego, Calif., division of **Consolidated Vultee Aircraft Corp.** He was formerly production manager.

Three engineering executives who have joined the steam specialty div. of the **V. D. Anderson Co.**, Cleveland, are: **Bruce R. Wright**, **John T. Odbert** and **Michael J. Toth**.

**Paul M. Fischer** has been appointed chief methods engineer of the **Hyster Co.**, Portland, Oregon. Mr. Fischer was formerly Peoria factory manager and will be succeeded in this position by **W. H. Neptun**, formerly assistant factory manager in Peoria.

## OBITUARIES . . .

**R. I. Ingalls Sr.**, 69, founder of the **Ingalls Iron Works Co.**, **Steel Construction Co.**, the **Ingalls Shipbuilding Corp.** and others in Birmingham, died July 12 in Birmingham.

**George P. Hart**, 90, former president and chairman of the board of the **Stanley Works**, New Britain, Conn., died July 13.

**Cornelius F. Roland**, 65, former assistant sales manager of the **National Tube Co.**, Pittsburgh, an affiliate of the **U. S. Steel Corp.**, died July 12 in his home in New York.

**Hampson Carey**, 54, treasurer of **Jones & Laughlin Steel Corp.**, Pittsburgh, died July 13.

**Fred J. Stineman**, 41, chief engineer for the Long Beach div. of **Douglas Aircraft Co. Inc.**, Santa Monica, Calif., died July 6 at his home in Long Beach, Calif.

**Ward B. Perley**, 87, formerly head of the **Canadian Steel Corp. Ltd.**, a subsidiary of the **U. S. Steel Corp.**, New York, died July 9 at his home in Dublin, O.

**Frederick S. Corrigan**, 74, chairman of the board of directors of **General Steel Wares Ltd.**, Canada, died July 7 in Toronto. Mr. Corrigan had been associated with the firm and its predecessors for 54 years.

**R. H. Hayward**, 76, president of the **Kewanee Mfg. Co.**, Kewanee, Ill., died July 10.

**Howard W. Kurtz**, 59, assistant treasurer and director of the **Crosby Co.**, Buffalo, metal stamping firm, died July 11. He had joined the company in 1913.

**H. Raymond Shollenberger**, 68, president of the **Pennsylvania Electric Steel Co.** and the **Windsor Broom Works Co.**, Hamburg, Pa., died July 12.

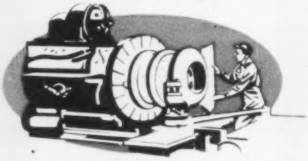
**Henry H. Champ**, 85, one of the founders of the **Steel Co. of Canada**, Hamilton, Ont., died July 10 in Hamilton.

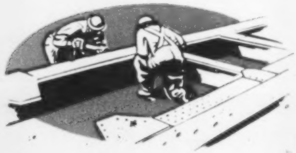
**Ronald J. Waterbury**, 52, assistant chief engineer, **Chevrolet Motor Div.**, General Motors Corp., Detroit, died July 9. Associated with Chevrolet since 1929, Mr. Waterbury had been chairman of the Detroit section of the Society of Automotive Engineers in 1945-46.

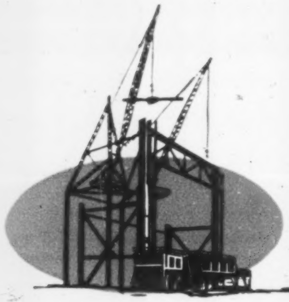
**John C. Hopkins**, 66, former superintendent of steelmaking operations for American Steel & Wire Co., Cleveland, died July 17 in Cleveland. Since his retirement from that company in 1935, Mr. Hopkins had been representative for William M. Bailey Co., Pittsburgh.

## "It ain't the individual nor the army as a whole But the everlastin' teamwork of every bloomin' soul."

Excerpt from "Cooperation"
*by J. Mason Knox*







When a contract is awarded to Heyl & Patterson for Heavy Bulk Materials Handling Equipment every member of the H & P organization "Gets Into the Act."

Heyl & Patterson's ability to do the WHOLE JOB, *with their own forces*, All The Way from Design to Erection until the apparatus is performing satisfactorily, has earned the respect and confidence of our customers in the Mining, Steel, Power, Railroad and Aluminum industries.

Heyl & Patterson can guarantee *"CONTROLLED QUALITY"* because we have *OUR OWN* Engineering Department, *OUR OWN* Fabricating Plant and *OUR OWN* Erection Department.

Since 1887 the economic value of H & P *"CONTROLLED QUALITY"* has been demonstrated by the performance records of Heavy Bulk Materials Handling Equipment, designed, fabricated and erected by Heyl & Patterson.

Every *NEW* Contract is a *NEW* Challenge not only to H & P Engineers but to every person in our fabricating Plant and in our Erection Department.

The *WHOLE JOB HAS TO BE RIGHT*. This is the H & P Policy that governs every step of the way from the first consultation with a customer until the *WHOLE JOB IS IN SUCCESSFUL OPERATION*.

Ore Bridges
Railroad Car Dumpers
High Lift Turnover-Rotary
Coal Preparation Plants
Coal & Coke Handling Equipment

Boat Loaders and Unloaders
Rotary Mine Car Dumpers
Coal Crushers
Coal Storage Bridges
Car Hauls and Boat Movers

Bradford Breakers
Refuse Disposal Cars
Thorsten Coal Sampling Systems
Kinney Car Unloaders

Pig Iron Casting Machines
Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reineveld Centrifugal Dryer

**Heyl & Patterson, Inc.**
"SINCE 1887"

**Heavy Bulk Materials Handling Equipment**
***All The Way from Design to Erection***

55 WATER STREET · PITTSBURGH 22, PA.

STEEL July 23, 1951

# Production AND Engineering
## NEWS AT A GLANCE

**INDUCTION ANNEALING—** Localized heating of deep drawn steel stampings frequently is necessary to anneal severely worked areas, such as around headlight openings in automotive fenders. Gas torches and specially designed jet-type burners have been used for the purpose, but they do not give uniform heating and the danger of overheating is present. Electric induction equipment has taken over, and in one body plant a critical area of 96 sq in of fender steel is brought to 1700 °F in 20 seconds. Pancake-type heating coils give a uniform heat pattern, eliminate hot spots. Incidentally, estimates indicate installed radio-frequency heating capacity in the U.S. now exceeds 500,000 kw and is valued at $75 million.

**PUTTING IONS TO WORK—** Ion exchange resins of the anion and cation types, originating some years ago in Britain and Germany, have commercial potential for such things as purification of solutions and reclaiming metals from liquid wastes. Their action is a complex one and their technology has been little publicized, perhaps because so much of it is clammed up in the Atomic Energy Commission.

**TESTING FUEL NOZZLES—** A simple fuel injection nozzle tester devised by Air Force mechanics at Okinawa saves B-29 maintenance crews hours of time formerly spent in locating malfunctioning nozzles and provides insurance against dangerous and costly engine failures. Built by "scrap pile technicians", the device features a gas-tight plastic box, in which suspected nozzles are tested under pressure. Visual check of the gasoline spray angle quickly indicates whether the nozzle is operating properly.

**PINT-SIZE TURBINES—** Small gas turbines for driving aircraft accessories or delivering auxiliary power are being built on the West Coast in two basic types, one producing compressed air equivalent to 65 air horsepower, the other developing up to 85 shaft horsepower. They are about the size of a hand valise, weigh 150-175 pounds, are completely encased in stainless steel. Shaft speeds range from 50,000 up to 84,000 rpm, brought down through gear reduction units. Turbine hot wheels are of Inconel X, 70 per cent nickel-chromium "superalloy."

**ROLL OUT THE BARREL—** Machining the 1500-pound alloy steel barrel for a 90-mm tank cannon requires 35 separate operations after initial rough turning and boring. Most important is the preliminary "telltaling"—rough facing the ends of the forging, turning a short section on each end concentric with the bore and placing the piece on rollers so that indicator readings can be taken within the bore as the barrel is rotated. This makes known the amount of runout of the bore and the stock distribution around the bore; from these data steady-rest spots can be machined and succeeding steps in turning, reaming, honing and rifling carried out.

**CLEAR OILS IMPROVED—** Transparent, high-sulphur, active-type cutting fluids are being used successfully on machining operations where dark or black oils were thought to be essential. In one test, pushrods of SAE 4140 steel were threaded at speeds of 60-63 fpm; with a high quality black oil 700-750 pieces were threaded between chaser regrinds, and with a transparent oil 500-550. The interesting angle is that until recently the best transparent oil gave only 200-250 pieces before regrind was necessary.

**BEST FACE FORWARD—** Preliminary results of research on diamond-tipped rock drills, under way at the Bureau of Mines, suggests that more footage can be drilled and bits will last longer if the hard part of the industrial stone is identified and the diamond is set in the drill bit so this hard area digs into rock and ore. Gem cutters long have known that diamonds do not have uniform hardness, a fact which permits them to speed their work by cutting and polishing the softer directions and planes of the stones. Diamond bort for rock drill bits has random orientation in the cast metal of the bit, and it looks like this is due for a change.

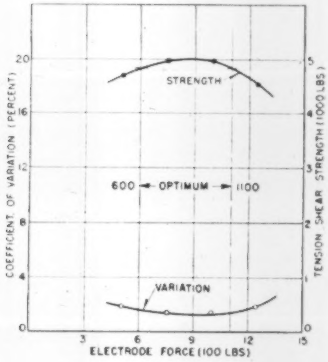
**TECHNOLO-GISTS:** Three lightweight .38-caliber revolvers, with 2-inch steel barrels, frames and cylinders of aluminum alloy, and weighing no more than 11½ ounces, are being given the O-O by the Air Force . . . A New York corporation has acquired U.S. patent rights to a process for producing a high-chrome surface on carbon steels by diffusion, thus improving resistance to wear, heat or corrosion . . . A "packaged" system for cleaning, pickling, phosphatizing and lubricating steel surfaces prior to drawing or extruding has been developed (p. 71) as the outgrowth of several years' work on cold extrusion for both ordnance and industrial applications . . . A top automotive metallurgist advises: "Boron steels are undoubtedly the answer on the constructional heat treated alloys but the base composition to be used is the question. The only answer we can get as to what, if any, alloys such as manganese, nickel, chromium and molybdenum are going to be continuously available, is that it is a month-to-month proposition depending on the supply and the requirements for these alloys in the defense program."

—A.H.A.

# Adequate Instrumentation Minimizes Welding Variables

**Close control of all welding factors can result in major savings in manhours and dollars by guaranteeing consistently good results. Suitable welding conditions can be duplicated and poor operational practice avoided**

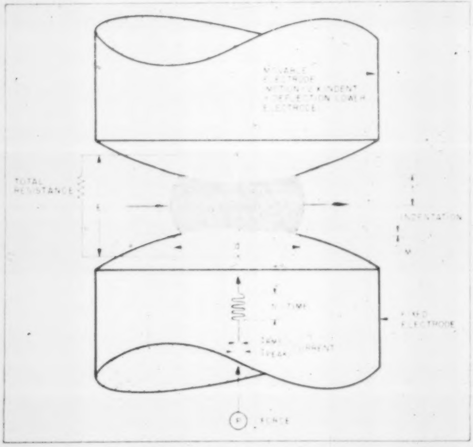
By J. HEUSCHKEL
Westinghouse Research Laboratories
East Pittsburgh, Pa.



Relation between welding force, spotweld strength and consistency (0.095-inch low carbon steel)

UNDERSTANDING the several welding processes and applying them constructively depends largely upon the existence and usage of adequate instruments. To describe the optimum welding conditions which will produce a satisfactory weld, it is necessary to measure the essential variables. Once these are measured, it becomes possible to describe precisely how the weld was made so that the suitable conditions can be repeated by others and the unsuitable conditions can be avoided by all.

**Prewelding Instrumentation**—Because the properties of the final welded product are often largely determined by the inherent characteristics of the steel before it is welded, the steelmaking and welding industries are mutually interested in control of steel quality and therefore in the successful usage of instrumentation for contributing toward that end. Uniformity of metal is an important part of that problem. It is generally possible to weld satisfactorily a composition which ordinarily reacts detrimentally when the welding engineer knows, in advance, that such characteristics are to be encountered, and can compensate for them. On the other hand, a uniform and relatively nonsensitive composition and temper can be harmed by unsatisfactory welding. Such faulty applications of the welding processes are damaging to the final structure. This is the point of reciprocal interest between the steelmaking and the welding industries


MOVABLE ELECTRODE (MOTION = 2 X INDENT + DEFLECTION LOWER ELECTRODE)
TOTAL RESISTANCE
INDENTATION
TIME
CURRENT
FIXED ELECTRODE
F FORCE

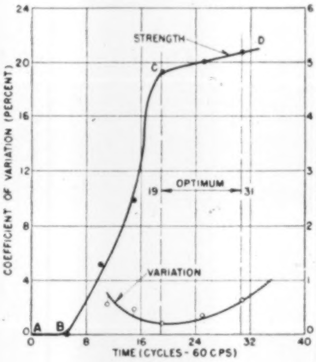
Spotwelding setup and variables

Welding equipment, for all processes, is essentially energy conversion systems. Electric resistance and arc welding machines, for example, derive their activating power from primary sources. The design and electromechanical construction features of welding machines are important to the performance of the processes.

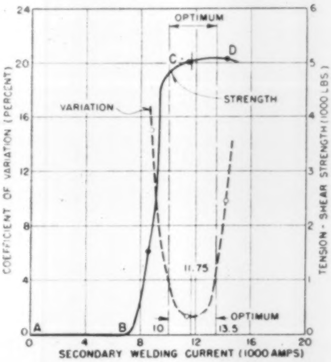
The manufacture of welding controls and accessories also requires the use of adquate instruments: Ammeters, voltmeters, electronic tube checking units, resistor calibration devices and oscilloscopes. The manufacture of welders' glasses must be controlled so that excessive amounts of the harmful infrared and ultraviolet rays will not penetrate to the eyes of the operator.

Welding gases must be of a suitable order of purity; excessive amounts of moisture or other impurities such as nitrogen may be detrimental to the properties of the welds. A recent development was the establishment of "welding grade" inert gases. Purities of those gases must be controlled and sometimes checked. The mass spectrometer is an invaluable, rapid means for such checking.

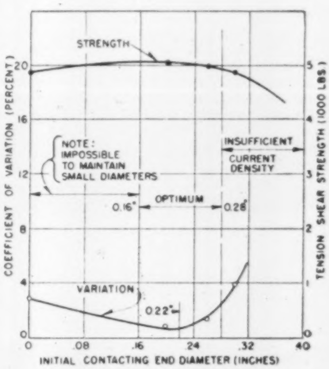
**Process Instrumentation**—Because all the common



Relation between welding time and spotweld strength and consistency



Relation between welding current, spotweld strength, consistency



Relation between contacting electrode diameter and spotweld strength and consistency

welding processes, and the related metals joining forms of brazing and soldering, involve the application and subsequent dissipation of heat to the local parts which make up the joint, the measuring problem involves an evaluation of those components which contribute to the total heat input and to those factors which also influence its rate of dissipation.

**Electric Resistance Welding**—Success of electric resistance welding processes depends upon the heat derived from the passage of high density electric currents through the parts being joined. Electrical conductivity, and its reciprocal resistivity, is one of the fundamental characteristics of metals. Of the common pure metals, silver has the lowest electrical resistivity, 1.59 microhms per cm at 0 C, and titanium with 80 has the highest. Iron has a value of 9.71 at that temperature. Resistivity increases with alloy content, cold work and temperature; the value of 9.71 for iron at 0 C increases to over 100 before the melting point is reached. Therefore the temperature coefficient of conductivity becomes an important consideration.

The fundamental variable in resistance welding is temperature and rate of change of temperature of the localized parts; yet temperature is never successfully employed as a criteria of weld quality control. It is never measured for thin parts although point approximations have been experimentally made for heavier parts. Temperature is not measured for several reasons: First, the rate of change of temperature is too fast for thermocouple response; second, the induced magnetic signal is larger than the temperature differential signal; third, it is extremely difficult to place the thermocouple where it is needed to detect the temperature in thin sheets. Temperature gradients are very steep, and a slight misplacing of suitable pickup probes, if they could be developed, would provide misleading results.

For the present, the most suitable measure of temperature is the use of the metallurgical thermometer, employing the concept that a known temperature-time cycle will produce a known hardness, microstructure or isotherm pattern.

Unfortunately, it is not possible to use this approach, except by sectioning a completed weld, thus using the indirect control approach. The modern inability to follow directly and precisely the strictly localized dynamic time-temperature cycle during the formation and cooling of the weld is still a blind spot in the precise study of the welding processes. For production control this is not a strong deterrent. By the judicious preselection of schedules which have a minimum of sesitivity to variations in procedure, it is possible to produce high quality welds with a minimum of production instrumentation, assuming the machines are originally calibrated and are periodically checked for performance.

**Fourth Basic Variable**—In resistance welding, brazing and soldering, a complicating factor is the presence of the initial discontinuity between the parts being joined, including the interfaces of the ultimate joint. Here the heating current must traverse a minimum of three pairs of contacting surfaces, whose interface resistance is not constant. More are involved for multiple thickness combinations.

To reduce this initial resistance to a minimum, to confine the molten metal and to assure nugget solidification as a unit, force is applied to the current carrying electrodes. This force may range in magnitude from a few pounds up to about 20,000 pounds, depending upon the material composition and dimensions. Force thus becomes a fourth basic variable. But static force will not be the same as the dynamic force if friction or inertia within the machine com-

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From data presented by the author at the Pittsburgh Section, Instrument Society of America, Mar. 28 and 29.

ponents are high. For prewelding machine calibration it is desirable, although not mandatory for steel, that the inertia, friction and motion characteristics be known. This is more important for projection, butt and flash welding.

The compression forces on the electrodes may be applied from lever, cam, spring, pneumatic or hydraulic sources. Mechanical potentials of these systems, neglecting friction, may be estimated by calculation from force and lever arm, by spring calibration or from the air or hydraulic line pressures multiplied by piston area. In any case, the actual static force may be obtained directly by use of force bar and calibrated dial. At least one pad should be electrically insulated. The force bar type of gage is preferred.

Both types are often deficient in that they require an excessive opening between electrodes for gage insertion. Here is room for improvement. Dynamic force measurement can be made by a setup which involves the now common wire strain gage as a signal pickup, an amplifier and a recorder. Steel braid shielded coaxial cable leads are used to reduce magnetic signal pickup from the electromagnetic field of the welding current.

**Force to Signal**—Such dynamic force-measuring devices are designed to translate mechanical force into an electrical signal. The medium chosen is the known interrelation between stress and strain for a concentrically loaded column. The strain is transmitted to the wire gages which must be properly located on the column, four gages being used to compensate for possible eccentricity. A modified Wheatstone bridge network provides the signal, which is transmitted to the oscillograph through the proper stages of amplification. The wire strain gage is a low inertia unit in which the resistance varies directly with its length and inversely as its cross sectional area. Detail requirements are that the device function accurately within a high density, rapidly fluctuating electromagnetic field created by the welding current; it should be insensitive to minor temperature variations and should not affect the welding operations.

Dynamic motion may be recorded, if and when desired, by securing a signal from a fixed coil and a movable core. This secured motion record plotted with time as an abscissa shows approach velocity, rebound occurrence of indentation, and time and velocity of electrode separation. The lower line of the envelope trace describes the motion of the upper electrode with respect to the lower one. Strain gages attached to lever devices have also been used for studying projection collapse.

**Calibration Simplified**—Inability of the movable electrode to follow-up the collapsing metal is likely to cause difficulty in any resistance welding operation but this item becomes most important in the projection and flash welding operations, insofar as steel is concerned. It is therefore prudent to know in advance that a machine purchased for such a project be calibrated and proved satisfactory before usage. Fortunately for the steel industry, the more rigid requirements in follow-up speed of the nonferrous metals for simple spot welding have assured existence of low inertia, high speed heads suitable for the welding of steel. The motion device or some equivalent instrument, greatly simplifies the task of machine calibration for such purposes.

Initial surface condition of material, as evaluated from resistance, can be described by the use of a surface resistance meter. Here any desired electrode shape and composition may be employed with variable force and current and the ohmic resistance read off the dial directly.

Because the surface oxides and other foreign material tend to contaminate the contracting ends of the electrodes, clean material surfaces are desired. For this reason, pickled and oiled or cold finished surfaces are normally specified for resistance welding in production. Variations in surface can be evaluated in terms of total resistance, which essentially means surface resistance.

But again with the force systems, there is a difference between static and dynamic conditions. Metallic resistance changes with temperature. A spot weld in 0.010-inch sheet may be completed in one cycle of a 60 cycle frequency current system, therefore average rate of temperature rise may be at least as much as 164,000 F per second, even assuming the nugget only reached, but did not exceed, the melting point of 2800 F. Rapid changes in resistance can therefore be anticipated.

**Total Dynamic Resistance Not Measurable**—Total dynamic resistance during welding, either electrode-to-electrode, electrode-to-sheet, or sheet-to-sheet, cannot be measured directly at this time. Several attempts have been made to provide a continuously recording resistance evaluation device, but none has been successful. This value can be calculated from the E I ratio, provided both E and I are accurately determined.

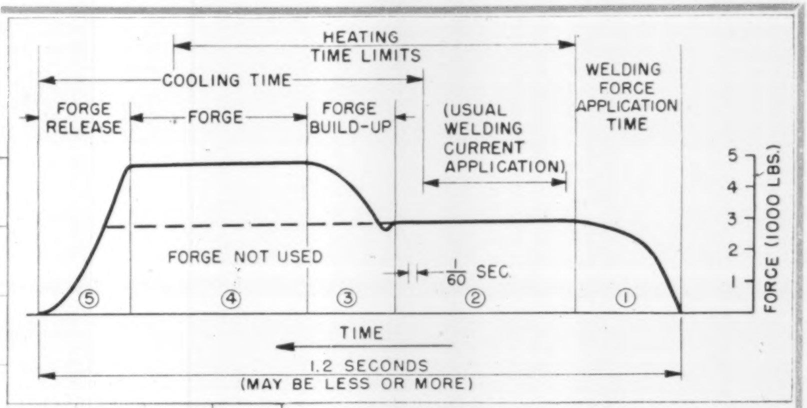
Dynamic voltage may be taken from across the two electrodes, shown in the first illustration, directly upon the magnetic oscillograph, or by a direct reading meter for an average observation. It is important that the inductive pickup be kept small or that it be counterbalanced by an internal loop. The preferred means would be to conduct the leads internally through the axes of the two electrodes.

Resistance welding currents may vary from a few up to 100,000 or more amperes. The most common method of measurement is by use of current transformers surrounding a suitable portion of a conductor. This may be done on either the primary windings of the transformer or on the secondary.

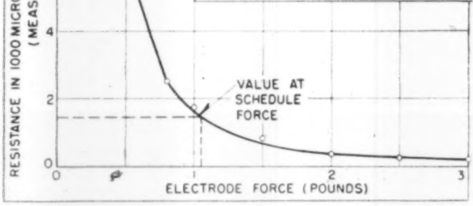
Most common practice involves measurement of the primary because of an ease of accessibility. When current is measured in the secondary circuit, an iron core toroid may be employed but for higher magnitude currents an air core toroid, composed of a group of individual coils, is superior since it is free of the possibilities of magnetic saturation. On shallow throat spot and seam welders, on multiple electrode spot welders and on projection welders, it is often impossible to place a pickup coil or current transformer around the appropriate current-carrying parts of the secondary circuit.

Actually, no direct reading current meter will give precise magnitudes for the current because that value is not constant throughout the formation of a weld.

Secondary current, neglecting welder transformer



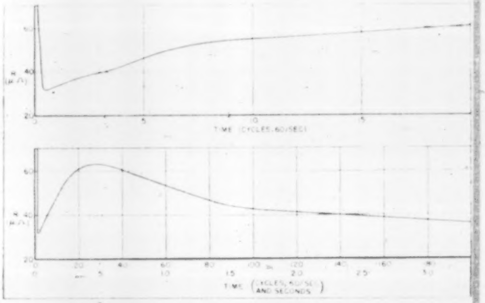
Two-stage force-time record from oscillograph

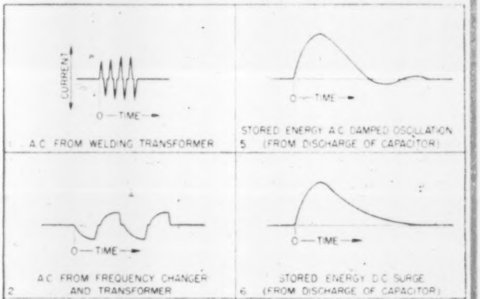


Above—Chart showing the relation between force and contact resistance

Right—Resistance vs time for spot welding steel (12,000 amp, tap No. 4, heat 61, strips 0.12-inch thick, 1500-pound force

Right, below—Spotwelding current wave shapes and energy sources




CURRENT
0—TIME
1 A.C. FROM WELDING TRANSFORMER
STORED ENERGY A.C. DAMPED OSCILLATION
5 (FROM DISCHARGE OF CAPACITOR)
2 A.C. FROM FREQUENCY CHANGER AND TRANSFORMER
STORED ENERGY D.C. SURGE
6 (FROM DISCHARGE OF CAPACITOR)
3 D.C. FROM DRY DISC RECTIFIER
STORED ENERGY D.C. SURGE
7 (FROM COLLAPSE OF MAGNETIC FIELD)
4 D.C. FROM STORAGE BATTERY
STORED ENERGY D.C.
8 (FROM STORAGE BATTERY)

losses, may be calculated from the primary current multiplied by the ratio of the turns of the primary and on the secondary systems.

The secondary voltage is the primary voltage divided by the turns ratio, which is therefore derived from:

Turns Ratio $= E_p/E_s$.

**Voltmeters Used**—For these measurements, voltmeters with a capacity from 1.25 to 3.0 times that of the ultimate readings are used. Such measurements are made with welding dies or electrodes separated by insulating material. Simultaneous primary and secondary readings are taken. Since there are, in fact, variable welder transformer losses, calculated secondary currents may be in error from 5 to 10 per cent. Therefore, for such values to have meaning, the transformer characteristics must be known.

Oxides are highly resistive to current passage at normal temperatures but become partial conductors at elevated temperatures. Resistance to current passage may also be decreased by increased pressures. Efforts have been made to employ advantageously a combination of these two features by using semispherical domed electrodes, high initial forces and a low rate of rise of current.

**Low Frequency Systems**—Low frequency alternating and direct current (*Please turn to Page* 88)

# Seen and Heard in The Machinery Field

By GUY HUBBARD
*Machine Tool Editor*

**FRENCH MACHINE TOOLS:** A letter from the commercial counselor of the French embassy in New York reminds us that from September 1, through 10, 1951, there will be held in Paris what he calls the first European Exposition of Machine Tools under the European Committee of Co-operation of Machine Tool Industries. According to this announcement, 600 builders will show more than 2000 machines and a lot of related equipment. September in Paris—so the announcement hints—is a particularly pleasant period of the year to combine business with pleasure.

With the announcement comes a special show issue, dated June, 1951, of *la Machine-Outil francaise*. This 130-page trade journal gives convincing evidence that France now has a machine tool industry of no mean proportions. The immediate conclusion to be drawn is that Marshall Plan money has been a distinct stimulant to this industry. While it does not loom up as a prospective competitor to the American machine tool industry here in the United States, it certainly does show signs of being a lively competitor elsewhere—especially in those countries where the metric system prevails.

Study of the well-planned and well-illustrated advertising in the French trade journal fails to reveal any of the high production station-type machines which are familiar sights in American production shops. Neither are there any multiple spindle automatics, either of bar or chucking types. There are, however, a number of business-like appearing single spindle automatics, together with about every other type of machine tool of high and low production variety.

Unlike British machine tools—which in recent years have come to have a remarkable resemblance to their American cousins in external appearance and in internal design—these French machines have style all their own. To use a western term, they look "tall in the saddle". By that I mean that most of the lathes, turret lathes and related machines appear to have headstocks which stand much higher above the beds than do those of standard American machines.

The reason for this probably is that thrifty French industrialists—with their generally small production runs and greater diversity of products—prefer machine tools with wider range of work capacity than is common here in the United States. This same philosophy seems to show in the design of many other French machines. Their radial drills have extraordinarily long arms, their vertical milling machines have much more overhang than ours, their universal milling machines have long overarms. Even their gap bed presses have unusually deep throats. These characteristics are bound to seem about as peculiar to us as did our French allies liking for frog's legs to our Revolutionary ancestors. However, the catchphrase "50,000,000 Frenchmen can't be wrong" may be true as far as the French and certain other foreign markets for "machines-outil" are concerned. American machine tool builders should investigate the situation with eyes and minds wide open. Remember, a lot of us Yankees have learned to appreciate frog's legs.

**PROTECTION FOR DRAWINGS:** Item entitled "Illegible Drawings", published on the Seen and Heard page in the June 25, 1951, issue of STEEL, drew quick, meaty comment from Harold A. Zimmer, Transparent Shade Co., Los Angeles.

In a letter neatly encased in one of the company's products—a transparent plastic envelope designed to protect working drawings and factory orders against rigors of shop service—Mr. Zimmer says: "Your cogent paragraphs regarding illegible drawings were read here with great interest. The points you made are the foundation for the sales in our industrial division which has been helping the metalworking industry cut losses since beginning of World War II."

Mr. Zimmer in turn contributes some cogent paragraphs as to how unprotected shop drawings cause industrial losses—these being the stage business for the following tableau:

"A man shuts down his machine to read a dirty, smudged blueprint, shop order or job ticket. He gives up. He approaches the man at the next machine and says: 'Say, Joe, I can't make this out, can you read what it says?' Joe shuts down his machine and takes a look. Finally they call their foreman.

"All three then discuss production instead of working at it—two machines being idle in the meantime. When finally they come to a decision, it either is 'Guess we'll take a chance on doing it this way—gotta keep 'em rolling,' or 'Can't figure it out—better call the blueprint department.' The first alternative carries a 50 per cent *possibility* of wasted materials and labor, the second *guarantees* lost working time and idle machine time."

Thanks, Mr. Zimmer. You certainly have amplified and implemented our sincere plug for more legible shop drawings. Also your incidental plug for your own product ably demonstrates the truth of a statement which appeared on page 77 of our July 9, 1951, issue. That statement was: "Selling Isn't Dead!"

**STANDARDIZED POST HOLES:** A most effective "preachment" in explanation of—and in support of—our American system of voluntary industrial standardization, is embodied in a pamphlet entitled *The Strange Case of the Seven-Sided Post Hole*. This was released to me by American Gear Manufacturers Association. It is published by American Standards Association, 70 East 45th St., New York 17.

With the production of prefabricated post holes as its theme, this fable traces development of a trade association and of national standardization of the products. The fable reaches its climax when members have to rush to Washington to dissuade experts in the five-sided building in Arlington from imposing on the industry a seven-sided wartime design in place of the standardized, mass produced hexagon models.

# Integrated Phosphatizing System Brings Economies in Cold Drawing

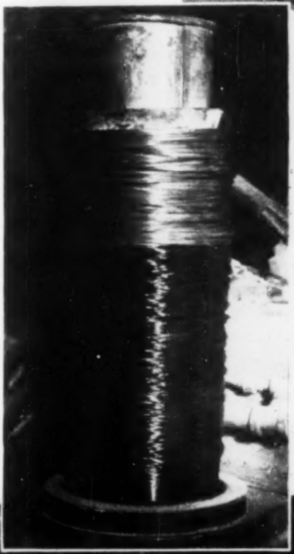
**Chemically bonded lubrication film trims scrap losses, lessens die maintenance in forming operations on tube, wire, rod and flat stock. Started with research on cold extrusion**

EARLY German work on the cold extrusion of steel disclosed that a key factor was the lubricant used on the metal surface during the drawing operations. Hence when Heintz Mfg. Co., Philadelphia, undertook its research program on cold extrusion (STEEL, July 25 and Aug. 1, 1949) attention was devoted to phosphatizing as a pretreatment for cold shaping. New types of phosphate coating chemical baths were developed and later engineers of Pennsylvania Salt Mfg. Co. were brought into the program. Joint research by the two companies has resulted in the evolution of the Pennsalt "Foscoat" metal preparation process.

Of interest to the metalworking industry are results which have been attained with the process in applications like tube drawing, wire drawing, deep drawing or ironing, deep stamping, cold heading, etc. The chemically bonded lubrication film has demonstrated such economies as elimination of intermediate press operations, as well as annealing and chemical treatments; increased production with existing equipment; reduction in scrap losses, and extension of die life.

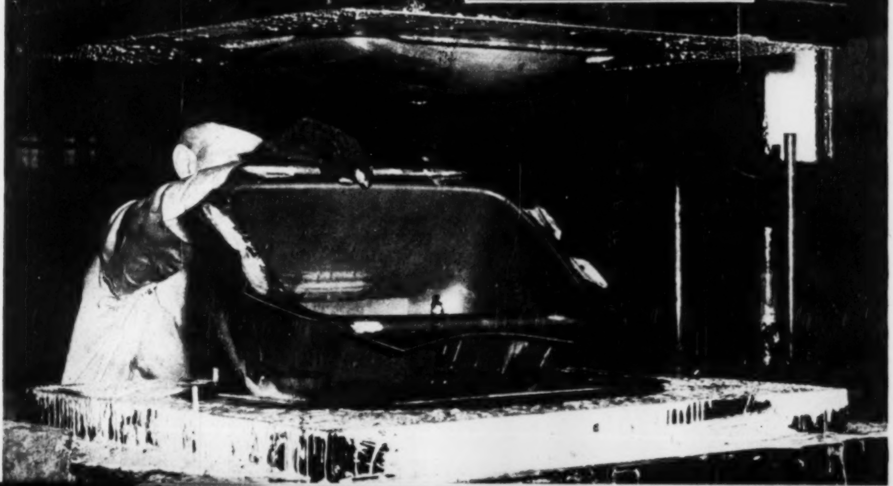
**Die Life Up 2½ Times**—For example, in wet drawing of fine steel wire, application of the phosphate process resulted in a claimed 40 per cent increase in production rate and a 250 per cent increase in die

Above—Tubular steel section was drawn from the cup in four operations with no intermediate annealing and a single application of phosphate coating. Reduction in wall thickness is on the order of 85 per cent



Wire on the lower portion of the spindle has been phosphatized before drawing, contrasting with lime-coated material above. Dark color and high gloss are characteristic; drawing speed was up 40 per cent

Reduced scrap losses and less downtime for die maintenance have resulted from phosphatizing flat stock used in drawing this gasoline pump dome. White liquid is lubricant applied manually



life. In dry drawing of steel wire shapes, such as triangle and square wire, from round stock, one application of the phosphatizing permitted drawing to finished shape without anneals and recoating formerly required.

Production use of the process at Heintz has made possible substantial economies in fabrication of automatic washing machine steel tubs, reductions in scrap losses due to rejects and in down-time for stoning dies being reported to have brought an increase in output of 140 per cent. In deep drawing or ironing of steel cartridge cases, 80 per cent reductions in wall thickness are claimed possible with a single application of phosphatizing, without intermediate annealing —a 100 per cent improvement over conventional practice.

In rod-pulled tube drawing, overall reductions of 80 per cent were achieved with a single application—a 60 per cent improvement; while in a tube mill using plug drawing reductions of 60 per cent were made—a 60 per cent improvement over former practice.

**Carrier for Lubricant**—The coating is a specially formulated phosphate which can be applied by immersion, flooding or spraying to form a strong, adherent film chemically bonded to the steel. This highly adsorbent coating functions as a carrier for an organic lubricant which is designed to react with the phosphate, in addition to being physically absorbed and adsorbed. The combined action is said to give a heat-resistant surface interlocked with the steel base and having exceptional adherence even under the most severe working conditions.

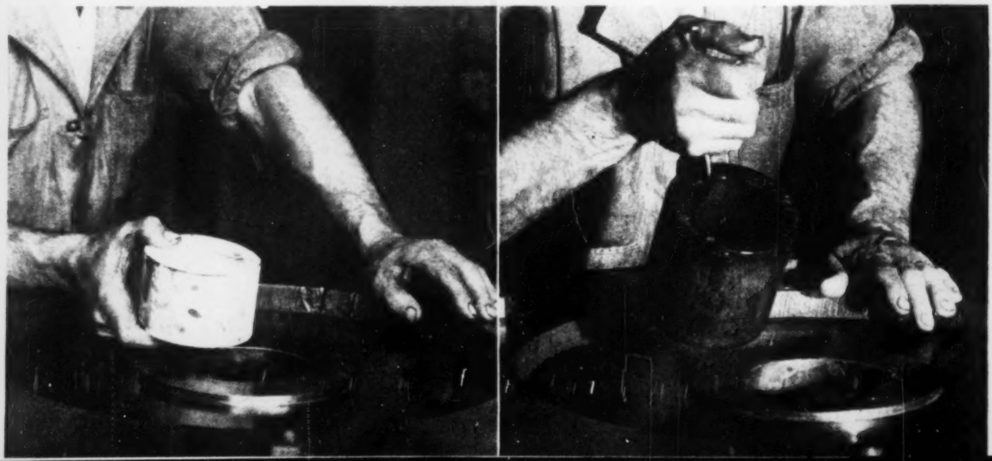
In view of the importance of proper precleaning and preparation for cold working, the complete process has been worked out to include pickling and special alkaline cleaners, sold by Pennsalt under the product name Fosclean. This is pointed to as an advantage to plant users in that Pennsalt, which has formed a new sales group to merchandise the system, will be able to supply a completely integrated process, with all necessary chemical ingredients as well as technical service. The latter includes layout and equipment design as well as mechanical engineering service on tool and die design to insure optimum performance with the new lubricant.

In early research (1949) by Heintz on phosphatizing for severe cold reduction it was reported coating weights between 1.5 and 4 grams per square foot were advisable. The solution was based on the zinc phosphate and zinc nitrate content, with the proportion between phosphoric acid (as $P_2O_5$) and nitric acid ($NO_3$) in the operating solution being 1:1. The bath showed approximately the following content: Zinc 20, $P_2O_5$ 25, $NO_3$ 27, nickel 0.1-0.2 and copper 0.004-0.005 grams per liter. In the past two years there have been a number of modifications of solutions and cycling details, about which Pennsalt for the moment is not releasing information because of the "patent situation."

**Clean-Pickle-Coat-Lubricate**—However, a typical cycle for treating steel prior to cold working is as follows: 1. Immersion for 3-5 minutes in 4-6 oz/gal alkaline cleaner at 200-212° F (not used in connection with rod or wire). 2. Cold water rinse. 3. Immersion for 5-30 minutes in 10 per cent sulphuric acid solution at 140-160 ° F (not used for stampings). 4. Cold water rinse. 5. Into phosphatizing bath for 3-5 minutes, temperature 160-180° F. 6. Cold water rinse. 7. Immersion for 1 minute in 0.1 per cent inhibitor rinse. 8. Immersion for 1-5 minutes in 5-10 per cent lubricating solution at 180° F. Lubricant is usually applied by spraying or manually at presses in the case of stampings.

Type of lubricant varies with the application, there being a dozen or more developed for the purpose. One type which has been used is a 2 per cent sulphonated tallow emulsified in a 1½ per cent sodium stearate solution.

The process already is being used regularly in a number of plants cold working steel, and the immediate objective is to extend it to other cold working operations where it may be applicable. The system has been employed successfully in conjunction with all grades of plain carbon and SAE alloy steels, plus some medium alloy grades. At present, it is not intended for use with stainless or other high-alloy steels.



Steel billet (left) has been given phosphatizing treatment before backward cold extrusion to the cup (right), first step in forming hollow cylindrical bodies such as shell cases. Reduction is about 50 per cent overall. Alternate method would be to hot forge or hot upset a billet of about twice the starting size used in extrusion

# Refined Honing Method

## Levels "Hills and Valleys"

PROFITABLE use of Superfinishing, a process which produces a fine geometrical surface, is illustrated by results experienced by the Woodward Governor Co., Rockford, Ill., during the last two years. The example is a main drive shaft of a diesel engine governor which operates in a vertical plane with an oil seal installed within a mounting flange. The function of the seal is to prevent engine oil from entering the governor housing and contaminating the sump oil.

Prior to the current finishing method, the oil seal surface of the shaft was carefully ground to a finish of approximately 10-15 micro-inches rms. While this provided a normally good bearing surface, nevertheless, with wear, occasionally added governor maintenance was required because of oil leakage. Such leakage in diesel service requires immediate attention. Thus, efforts were concentrated toward finding a means of reducing frictional heat and wear, and thereby increasing seal life and minimizing maintenance.

**800% Longer Life**—Accordingly, finishing methods were changed to include a final Superfinishing operation on the shaft oil seal bearing area. This has resulted in an increase of 800 per cent in oil seal life, according to operating records to date.

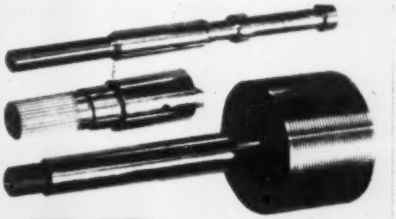
As shown in the first illustration, a Gisholt model 51 Superfinisher is employed. The work can be easily performed on this machine by a girl operator at speed that adds little to overall costs. Parts are received at the machine with a ground finish of 10-15 micro-inches rms. Material is AISI A8642 steel hardened to 45-55 Rockwell C. Surface $1\frac{15}{64}$-inch wide on the 0.8110 diameter is finished to 3 micro-inches rms at a production rate of 40 pieces per hour.

Before and after inspection of the workpiece is done by the machine operator. Loading, unloading, and inspecting can be accomplished just as rapidly as the operator can conveniently complete these functions. Inspection is employed as a safeguard to insure required dimensional accuracy of preceding operations, as well as of the Superfinishing.

**Other Parts Improved**—Speed of operation and the profitable results achieved has led to increased use of the method on other component parts to further improve quality and service of the product. A summary of material specifications and the type of finish used is as follows:

| Name of Part | Material | Hardness | SF Area | Finish |
|---|---|---|---|---|
| (1) Drive Shaft | AISI A8642 Steel | 45-55 Rockwell C | .811 dia. x 1-15-64 wide | 3 rms |
| (2) Power Piston Assembly | 360018 Steel | C.H. .005 deep, Rockwell 88-92 15N | .5515 dia. x 2.250 wide | 2 rms |
| (3) Lower Control Pilot Valve | AISI C-1118 Steel | C.H. .010 deep, Rockwell 88-92 15N | .436 dia. x 1⅛ wide | 4 rms |
| (4) Rotating Bushing | AISI A8620 Steel | C.H. .005 88-92 Rockwell 15N | .7498 dia. x 1.062 wide | 5 rms |

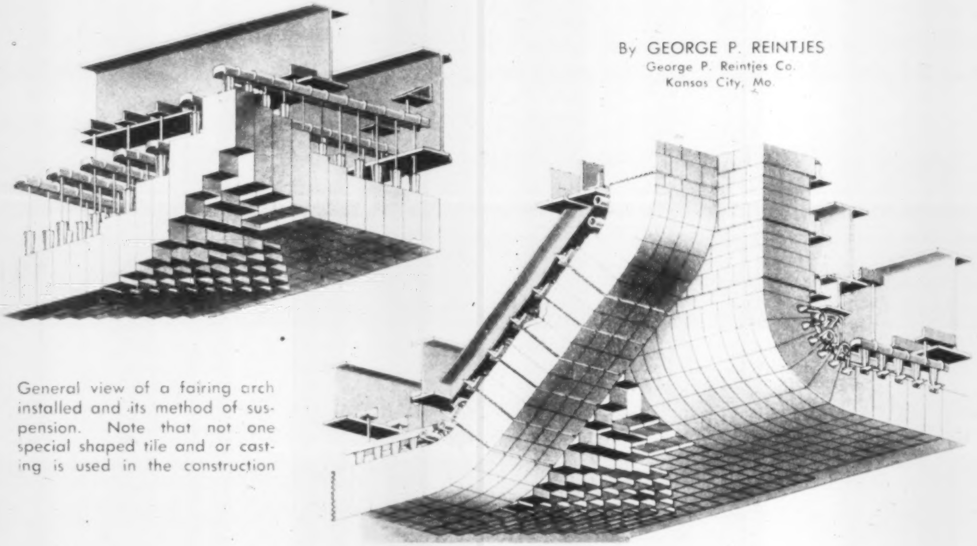
Benefits obtained through Superfinishing internal operating parts are threefold: Sensitivity is greatly improved; more exact fitting with few rejects is possible; and by reducing frictional drag, danger of seizure and excessive wear is correspondingly reduced. This process of producing superior cylindrical surfaces can be incorporated in a production system conveniently, with small outlay in capital investment and with only little added production time.



Below—View of inspection equipment and setup. Dial indicator checks dimensional accuracy. Brush analyzer is employed for micro-inch checking. Finishing operation is performed while operator handles inspection. Production averages 40 pieces per hour. Inset shows closeup of driveshaft part in position. Oscillatory motion of stone on rotating workpiece produces 3 rms finish. Right—Bearing faces of all these parts are Superfinished

# NEW FAIRING ARCH . . . *Lessens Fantail Erosion*

By GEORGE P. REINTJES
George P. Reintjes Co.
Kansas City, Mo.



General view of a fairing arch installed and its method of suspension. Note that not one special shaped tile and or casting is used in the construction

REFRACTORIES and their installation probably are the greatest single item of maintenance cost in any steel plant. As unscheduled furnace shutdowns for masonry arch repairs prove costly in lost production, suspended or supported arches have proved their worth in many ways, such as affording longer campaigns and increased production.

Because all makes of suspended arch designs need refinement, an endeavor will be made to outline a few problems faced by the brick mason and give the solutions that have been developed. In building the connection between the curved fantail and the sloping chill wall of open-hearth furnaces, trouble is encountered because in some cases the bottom of the chill wall will be higher than the bottom of the fantail arch. In the next furnace, the reverse may be true. Sometimes in making a connection between the two diverging arches, the chill wall will be sloping for its entire length—then again, part of the chill wall may be sloping and connected to a horizontal arch extending over the slag pocket.

Heretofore the solution has been to square out the fantail nosing with angular tiles attached to the arch supporting castings and steel.

**Co-Ordinated Effort Required**—If metal clad or metal encased basic brick are used, further problems are added, since the special tiles required must be developed and manufactured to meet specific conditions. To properly make a connection between the chill wall and fantail nosing, requires the best efforts and co-ordination on the part of all concerned.

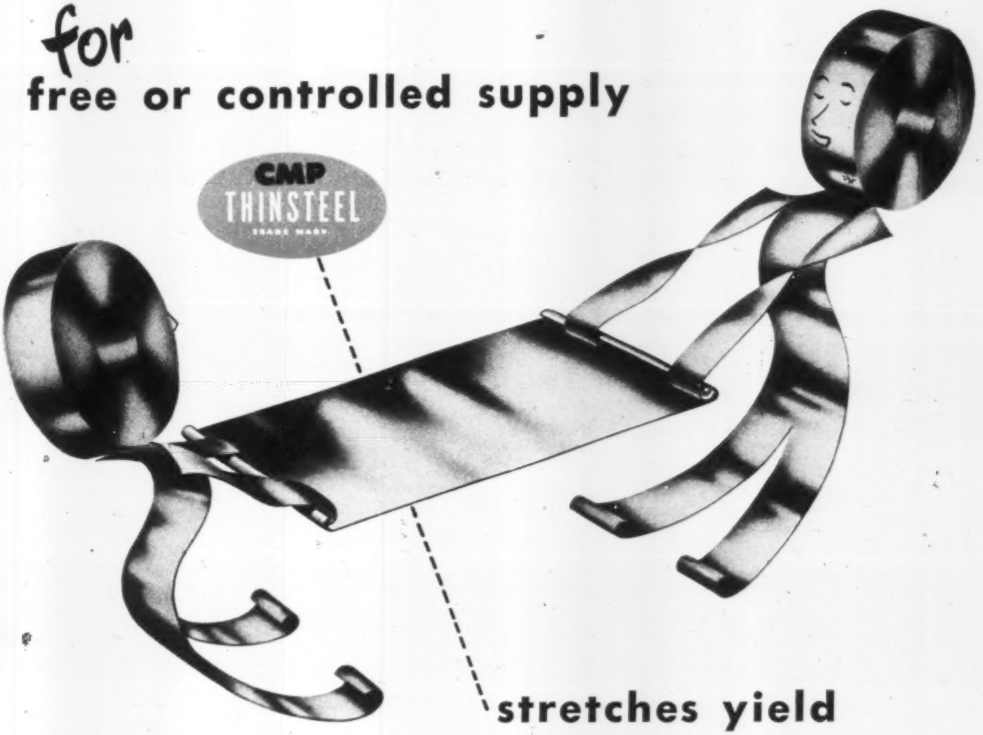
When it was decided to expand our arch and wall developments and enter the steel industry, we were intrigued by the seemingly unsurmountable difficulties and problems confronting the masonry superintendent. Our study of this problem resulted in the development of what is called a "fairing arch." The word "fairing" means: A member or structure, the primary function of which is to produce a smooth outline and to reduce drag or head resistance. With this approach we were able to eliminate the projection of "squared" nosing tiles from the path of gases traveling to and heated air from the checker chamber.

**Turbulence Eliminated**—It is well known to open-hearth operators that where squared tiles project into the path of the gas flow, a turbulence or eddying occurs which causes excessive erosion of the fantail arches. Knowing these problems, the solution was relatively simple—just hang the tiles individually or in pairs so that the bottom of each tile would have the fairing contour. A uniform minimum burning depth of refractories should be maintained in all portions of this arch connection by using, where necessary, some tiles longer than others. To adjust tiles in position to the proper height requires the use of adjustable refractory hanger rods.

To further simplify the problem, the fantail nosing is completely eliminated in the area of the roof where the fairing occurs, thus the arch can extend back to and become a part of the fantail arch.

If the fantail nosing supporting girder is located entirely too low to permit this fairing, it should be raised high enough to allow the arch to pass beneath. A short beam extending only the length of the fantail nosing can be used to support the radial portion of the arch.

*for*
**free or controlled supply**



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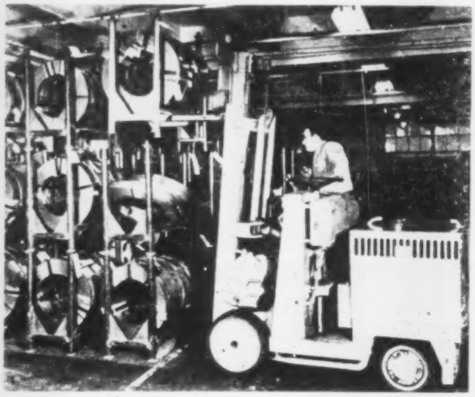
# Industrial Trucks Mechanize New Sales Warehouse

LATEST application of powered industrial trucks to handling material at the Towson, Md., plant of Black & Decker, manufacturers of portable electric tools and accessories, is in the company's new sales warehouse. In this building, with 60,000 sq ft of floor space some 50,000 of which is devoted to storage operations, two 2000-pound capacity telescopic lift fork trucks, plus a 4000-pound powered pallet-handling hand truck, comprise the industrial truck fleet. Because of the 16-foot ceiling approximately 750,000 cu ft of storage area is available, the fork trucks tiering material to an extreme height of 15 feet.

The former warehouse had 30,000 sq ft of floor space, 9½-foot ceilings. Practically every piece of material stored in this building was handled manually, with a crew of 18 men engaged in handling operations. In the new building all handling operations possible—including the loading of trailer trucks with outbound merchandise—are performed by the powered trucks.

**100 Tons a Day**—The two rider-type fork trucks are operated by girls. They are able, with the fork truck-pallet system to handle approximately 100 tons a day, or slightly more than 2000 tons of merchandise a month, in and out of storage, doing work that under former manual methods required a 12-man crew to perform. The total warehouse shipping force numbers 18 persons, most of whom were in the former material handling crew.

While at first glance it would seem that the company was compelled to increase its warehouse force by 50 per cent, the force in effect remains the same in number as previously. All are kept busy because the crew handles many times the volume formerly processed. Production also is keeping pace with the advanced handling methods; raw materials move into the production line faster, while finished product is removed with the same speed, and does not pile up awaiting removal.



Utilizing a special storage rack, each unit of which can accommodate a 300-pound load, a powered fork truck tiers a full load of coil steel used in making motor laminations

Use of powered industrial trucks at Black & Decker goes back to 1930 when a 400-pound capacity, high-lift platform truck was placed in operation in the production department, handling skid-loads of material into, along and out of production lines. The original truck still is used round-the-clock in the plant.

**Special Racks Used**—Trucks in the production department handle skid-boxes and large tote pans of material into assembly lines, and move semifinished, or completed assemblies into the storeroom warehouse area. Machined items also are handled in skid-bins. Coil steel, used in motor laminations, is placed in a special type of rack, both for storage and for handling. These racks designed and made at the Black & Decker plant, hold the coils vertically. Recesses, faced with flanges, are located in the bottom of the four legs of a rack. These recesses fit over flanged points on the top of the legs, providing self-adjusting stabilizing legs, insuring rigidity when the racks are tiered three or four high in storage.

Because the new warehouse building is located some distance from the main buildings, material is transported from the shipping area of the latter to the warehouse by means of over-the-road trailer trucks. These are loaded with goods destined for warehouse storage and outward shipment by means of powered fork trucks. At destination, the palletized loads are removed by means of the powered hand truck.

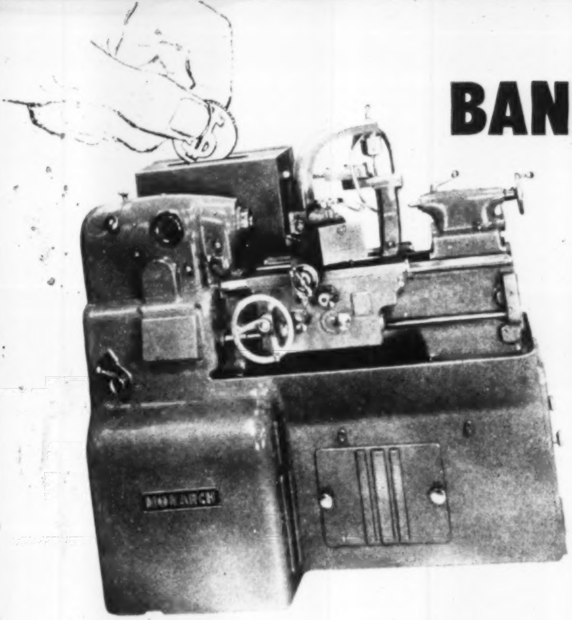
Maintenance of the entire fleet of powered industrial trucks is on a continuous basis, with the units being checked and examined during the second, or 4 to 12 shift at night. All trucks are in service approximately 7½ hours of the first shift, with part of the fleet being utilized on the second shift, and one or more units in intermittent service during the third shift.

## Tool Crib Controls Explained

A three way control of tools, jigs and dies is described by Remington Rand Inc. in a new folder called, "Seven Ways to Save with Simplified Tool Crib Control". Two basic systems are recommended, Kolect-A-Matic and Kardex, depending on the amount of detail desired.

During the last war, the tool crib control system resulted in increased production and seven definite savings listed in the folder. With a proved-in-practice, positive control, production is increased at the same time tool loss, repair, breakage, investment and purchasing costs are reduced. A carboned triplicate form, filled in once by each worker when he withdraws a tool, provides a form for inventory, a record of tools lost, damaged or stolen and a record of withdrawals. Both charge-outs and returns are quick and easy without the sacrifice of either close control or accountability of tools. Automatic distribution of tool costs to particular jobs or departments affects easier and more accurate depreciation charges, which show up in tax savings.

For details about tool crib control, request pamphlet KD 641 from Management Controls Division, Remington Rand Inc., 315 Fourth Ave., New York 10.



# BANK ON MONARCH-

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$ **SAVE VITAL MATERIALS.** Scrap losses, especially with unskilled manpower, can be high. Great reductions in spoilage occur when Monarch's duplicating methods replace the human factor in repetitive turning.

$ **SAVE ON SUBSEQUENT OPERATIONS.** With less stock left to remove, grinding time is often reduced by as much as 50%.

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$ **MULTIPLY OPERATOR'S OUTPUT.** Case histories show many instances where one Tracer-Controlled Monarch Lathe has replaced three or even four conventional machines. The fact that he can readily run two machines, on many classes of work, doubles the operator's output.

$ **SAVE ON TOOLS.** Save time and money on costly form tools—save on tool-sharpening and tool change time with the Monarch Tracer-Controlled single tool metal turning principle. Insert-type tools save even more! Let us show actual figures.

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— FOR A GOOD TURN FASTER . . . TURN TO MONARCH —

# COLD ROLLING STRIP

## An appraisal of today's theory and practice

**Tests on high-speed cold strip mills emphasize that variations in the speed of rolling affect the thickness of the finished product. Study purports to show that thickness of oil film in backup roll bearing may exert wide influence on the subject**

By J. D. KELLER
*Consulting Engineer and Partner*
*Associated Engineers*
*Pittsburgh*

### PART VII

THAT the thickness or gage of the finished strip is affected by variations in the speed of rolling has long been known; the tests of Stoltz and Brinks[37] on the high-speed mill at Weirton, and of Ford[3] on the experimental mill at Sheffield, showed this clearly. Both mills were equipped with roll pressure meters. Stoltz and Brinks found that both the reduction and the roll force increased when the speed was increased, but Ford found that, in all except the first pass, while the reduction increased, the roll force *decreased* with rising speed. In the tests of Stoltz and Brinks, the operators were continually adjusting the screwdown positions and the tensions in the attempt to maintain uniform gage of the finished strip; whereas in Ford's tests, the screwdown setting remained unchanged, and no tension was used.

Stoltz and Brinks suggested as an explanation of their results, the increase of oil film thickness in the backup roll bearings, as the speed increased. The author made some calculations concerning this, the results of which will be discussed in the following paragraphs.

**Speed Affects Position of Journal**—Theoretically, in a bearing in which "hydrodynamic" oil film conditions exists, according to E. Falz[18] the center of the journal (in this case the roll neck) is displaced as the speed increases, along a semicircular path indicated by *A-D-E-B* in Fig. 26, from point *A* at very low speed to point *B* at extremely-high speed, when it becomes practically concentric with the center of the bearing shell. Various experimenters have accurately measured the path of the shaft center, and found that it follows fairly closely the theoretical path, as indicated by the broken line just inside the semicircle in Fig. 26.

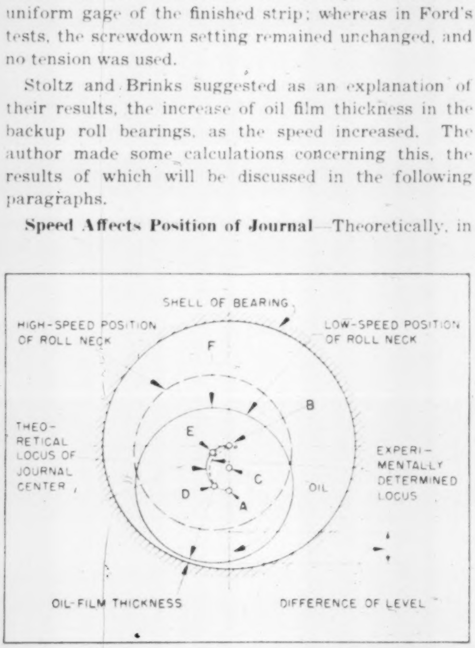
SHELL OF BEARING
HIGH-SPEED POSITION OF ROLL NECK
LOW-SPEED POSITION OF ROLL NECK
F
B
E
THEO-RETICAL LOCUS OF JOURNAL CENTER
EXPERI-MENTALLY DETERMINED LOCUS
C
D
A
OIL
OIL-FILM THICKNESS
DIFFERENCE OF LEVEL

Fig. 26—Shift of position of roll axis, due to change of oil film in bearing as speed is increased

In the strip mill, the axis of the lower roll might be at *D* when rolling at 400 fpm, and at *E* when rolling at 4000 fpm.

According to the author's calculations, for a bearing of 32½ inches diameter x 29¼ inches length, under a load of 775,000 pounds (an average value from Stoltz and Brinks' tests), lubricated with oil having a viscosity assumed to be 1370 seconds Saybolt Universal at 100° F or about 0.0130 kg-sec/m² at an assumed average temperature of 125° F, the increase of the distance between centers of upper and lower backup rolls due to decrease of oil film thickness resulting from decrease of speed, would be as shown in Fig. 27, for several values of the diametral clearance in the bearing.

**Clearance Difficult To Determine** — The difficulty lies in determining or estimating the clearance actually existing under operating temperature conditions. The diametral clearance between the roll neck bearing and its brass or bushing, *as machined* (hence when both parts are at room temperature), for rolls of the size of the Aliquippa or the Weirton mill is 0.030 to 0.035-inch. But a difference of only 100°F. between the average temperature of the roll neck or its sleeve and the temperature of the bearing shell or chock (the roll neck being the hotter) would be sufficient to produce a difference in expansion of 0.020-inch, hence to reduce the clearance to about a third of its magnitude when cold. Actual temperature measurements are lacking, and other thermal data are insufficient to permit them to be calculated with reasonable accuracy.

However, a clue is furnished by the statement of

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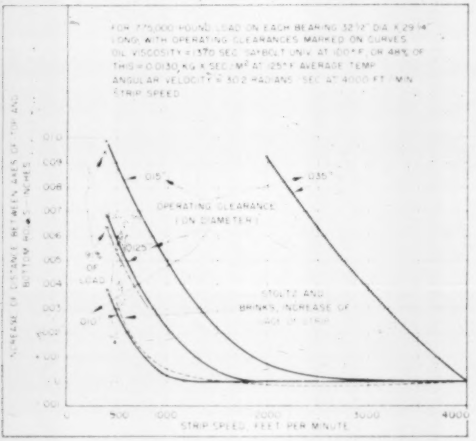


Fig. 27—Calculated increase of distance between centers of upper and lower rolls, due to change of oil film in bearings, when strip speed is reduced from 4000 fpm

Powell[27] that the clearance in the backup roll bearings of the Aliquippa mill had to be increased from the original 0.020-inch to 0.030-inch. The difference, or 0.010-inch, represents the *minimum* possible value of the operating clearance; it would correspond to zero thickness of oil film at operating temperature in the case of the original 0.020-inch cold clearance. But since actual seizing of the bearing apparently did not occur before the clearance was increased, the present operating clearance in the Aliquippa mill must be somewhat more than 0.010-inch, possibly 0.0125 or 0.0150-inch. The backup roll bearing diameter in this mill is not greatly different from that of the Weirton mill.

**Consider Spring of Mill**—Comparing the curves for various clearances in Fig. 27 with the Stoltz and Brinks curve (broken line) of increase of gage of strip with decrease of speed, the near-coincidence with the 0.010-inch clearance curve might be thought to show the latter to be correct, but the effect of the spring of the rolls, housings and other mill parts has yet to be taken into account. Only in passes Nos. 4 and 5 would a rolling speed of approximately 4000 fpm be reached; for pass No. 4, Stoltz and Brinks found a decrease of about 9 per cent in the measured force as the speed was reduced to 400 fpm. They also estimated the total spring of the mill to be about 0.050-inch under full load (which figure, incidentally, seems high). Hence the elastic spring-back due to the decrease of force would move the bearing blocks closer together to the extent of 9 per cent of 0.050-inch, or 0.0045-inch. For 0.015-inch operating clearance in the backup roll bearings, the increase of gage of the strip, as the speed is decreased from about 4000 to 400 fpm, would then be 0.0094-inch (from Fig. 27, for 91 per cent of load) minus 0.0045-inch or 0.0049-inch. For 0.0125-inch operating clearance, the increase of gage would be 0.0063-inch (Fig. 27) minus 0.0045-inch or 0.0018-inch.

Stoltz and Brinks' measured values are intermediate between these figures, averaging about 0.0040-inch. However, a complicating factor in their tests was, as they stated, the manipulation of the screwdowns and adjustment of the tensions by the mill operators in the attempt to maintain constant gage of strip during the slowing-down (which is required in order to thread the end of a new coil through the rolls) and the speeding-up, as well as to compensate for the variation of thickness from one end to the other of the entering hot-rolled strip. Some engineers also have expressed doubt as to the reliability of the Stoltz and Brinks results because of reported unsatisfactory operation of the tension-regulating devices during the tests.

**Watch the Sleeve-Bearing Clearance**—The smaller the operating clearance in the sleeve bearings, the sharper is the knee of the corresponding curve in Fig. 27 and the lower is the speed above which the effect of change of oil film thickness becomes negligible. With 0.015-inch clearance, there is still some variation at speeds as high as 2000 fpm, according to the calculations, whereas with 0.010-inch operating clearance there is negligible change above 750 fpm. On the other hand, the smaller the bearing clearance the greater is the danger of cumulative build-up of temperature differences with consequent wiping, seizing and scoring which may ruin not only the brasses or bushings but the steel sleeves forming the roll neck bearing surfaces; hence the necessity for continual observation and accurate control of the temperature of the oil entering and leaving the bearings of high-speed mills.

Calculated data in Fig. 27 are not presented as exact figures, since the variation of temperature and therefore of oil viscosity around the bearing circum-

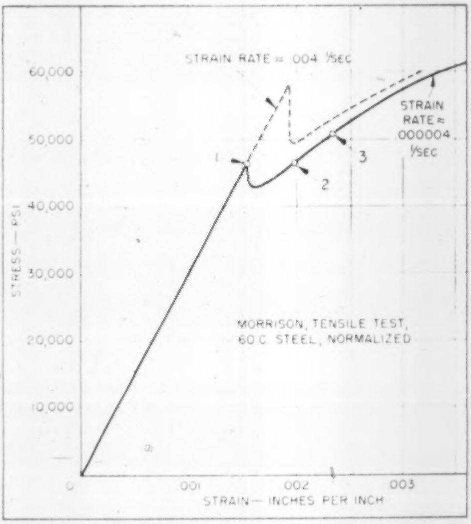
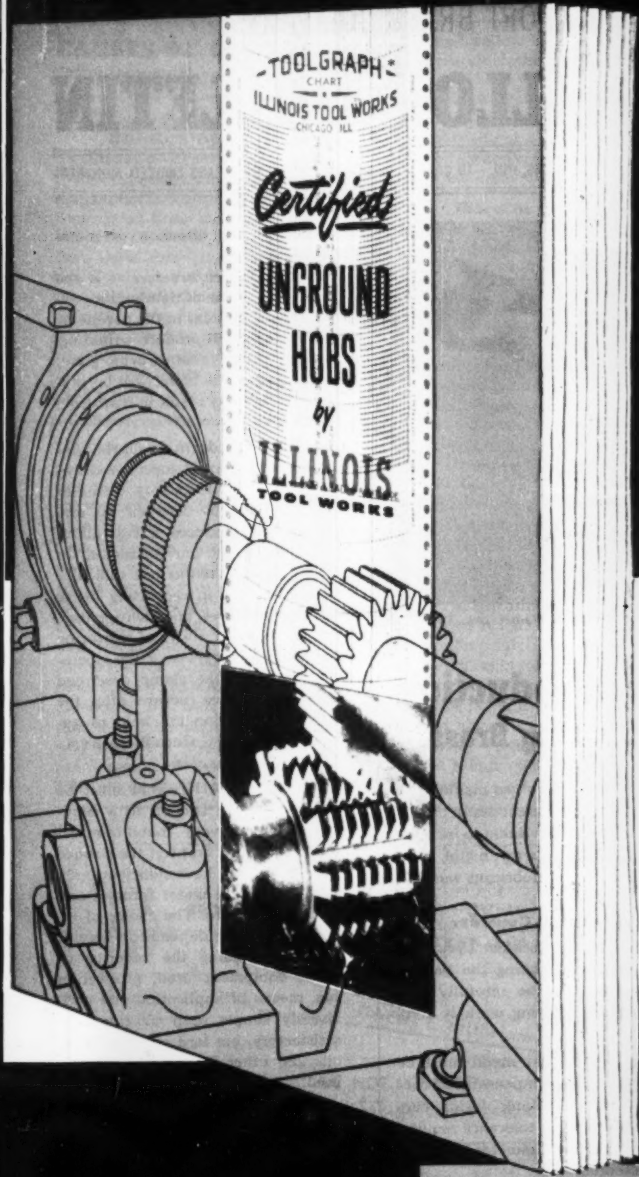


Fig. 28—Stress-strain curves at different speeds of deformation of 0.60 per cent carbon steel, normalized. (Morrison[11])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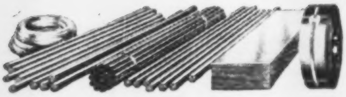

BRIDGEPORT BRASS COMPANY

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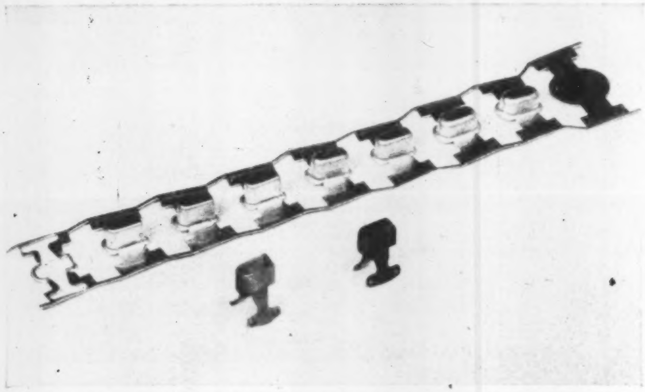

Showing progressive operations in the manufacture of clamp for telephone headset jack. Courtesy, Connecticut Telephone & Electric Corporation, Meriden, Connecticut.

## Careful Planning Before Production

### Avoids Trouble in Deep Drawing Brass

As in all things, experience in the deep drawing of brass and other copper-base alloys is the best teacher. The reshaping of flat metal into various cup-shaped objects on an efficient production basis is an intricate procedure, and involves skills and know-how. It is, therefore, wise to investigate the problem carefully before attempting to go into production. Help for the determination of the proper alloy for the particular job, and often suitable fabricating techniques as well, can be obtained from our Metallurgical Laboratory and from our literature such as Bridgeport's "Technical Handbook."

The illustration shows the progressive operations used in the production of a clamp for a telephone headset jack. This involves the deep drawing of a rectangular cup, which is not easy. Secondary blanking operations on the bottom of the cup and the formation of the brackets are shown in the small samples in the foreground. Considerable experimental work was done and further developments of the tools were necessary, which involved making two draws to obtain sufficient depth of cup. It was also found advisable to increase the width of the strip metal. The change to a lard oil lubricant was also helpful.

#### Factors to Consider

The following check-list should be helpful in demonstrating the various points which must be carefully considered before drawing work is actually begun.

1. *Stock*—The flat metal must be wide enough to compensate for contraction of the blank during cupping. Alloy, gauge, tolerance requirements; temper; diameter of arbor are essential.

2. *Punch and Die Radii*—Normal die radius is between 5 and 10 times the thickness of the metal. Too large or too small a die radius may cause trouble.

3. *Die Finish*—Careful polishing of the die is important, since there is a great deal of motion between the metal and the die. Dies should be lapped in the direction of metal flow.

4. *Blank Holder Pressure*—If the blank is not held tightly, the circumferential forces in the perimeter of the blank will produce wrinkling. If blank holder pressure is too great, thickening of the blank will be prevented, and may result in fracturing of the cup.

5. *Diameter Reductions*—In the production of a normal cup for redrawing, the most satisfactory diameter reduction ranges between 40 and 46%. This produces a cup about equal in height and diameter. In making greater reductions, difficulty is encountered in regulating blank holding pressures, and there is danger in the softer alloys of fracturing the cup. In progressive die operations, such as the clamp described above, successive redraws after the cupping operation are held to approximately 15%, since there are no intermediate anneals.

6. *Lubricants*—A lubricant must be used to reduce friction to a minimum and prevent metal-to-metal contact. It must first wet the surface thoroughly, and have sufficient body to stay in place under forming and drawing pressure. The choice of lubricant for a job depends on several factors, including the severity of work, equipment used, production run, means of application and cost. Usually simple soap solutions are satisfactory, but lard oils, vegetable oils and other lubricants are often used.

7. *Metal Surface Finish*—This is important especially in deep drawing operations such as in progressive and eyelet types of work.

This list is intended simply to point out some of the factors influencing success in drawing. Specific problems naturally arise in every individual job. Bridgeport will be glad to help customers with these problems by sharing its vast reservoir of experience acquired in the production and fabrication of copper-base alloys. (6831)

BRIDGEPORT BRASS COMPANY
**COPPER ALLOY BULLETIN** CONTINUED JULY, 1951

# CAUSES OF CORROSION

*This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.*

## DEZINCIFICATION CORROSION (Cont'd)

### Effect of Protective Scales

Certain waters which have deposited magnesium silicate or silica scales or coatings on brass surfaces are without effect on the brass. Under such conditions these silica or silicate scales are completely protective to the underlying metal and the alloy may last indefinitely. Dense adherent calcium carbonate scales are also effective in reducing or preventing dezincification but if too thick they will cut down the heat transfer rate of the metal.

### Non-Scaling Waters Are Corrosive

Dezincification is most likely to occur in non-scale forming fresh or salt waters. In many instances, difficulty from dezincification in susceptible brasses is unknown until such time as a scale forming water is softened by water treatment. Then it becomes necessary to use those copper-base alloys which are resistant to dezincification such as red brass, inhibited yellow brasses, arsenical Muntz, Admiralty or aluminum brass. The other alternative is to hold the mineral balance in the water at such a level that it will be slightly scale-forming.

It has been clearly demonstrated over a period of years that the greatest difficulty due to dezincification in non-inhibited yellow brasses has occurred in non-scale forming waters. For the most part such waters have a calcium carbonate saturation index of from minus 0.5 up to minus 3.5. This is usually characteristic of a water having a low total solids and calcium content and an appreciable amount of bicarbonate.

### Effect of pH Values

Dezincification can occur in fresh and salt waters with the pH ranging from 5.0 to 8.0 or higher. The pH value in itself is not particularly significant. It can, however, become very important where adjustment in the pH may lead to mineral scale formation or the dissolving of mineral scales.

Non-scale forming waters, such as a solution of sodium chloride, will lead to dezincification in a non-inhibited yellow brass in the presence of deposits at any pH value, ranging from pH 1.0 up to a pH of 12. In such media, however, the tendency of plug-type dezincification is more marked in the higher pH range and the tendency for general dezincification is greater in the lower pH range, with a rather broad twilight zone in the central section of the pH scale. This is evidently due to the solubility of the zinc corrosion products in solutions having either a very low or a very high pH value.

At this point, it is of interest to note that sea water having a pH of 8.0 leads to general dezincification of uninhibited Muntz metal at a rate of about .009 ipy.

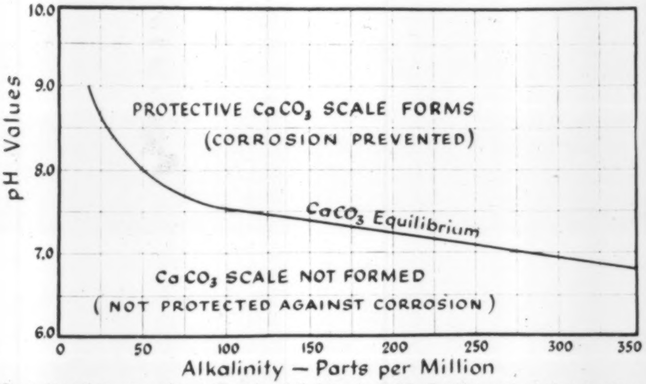

Chart shows that waters whose compositions fall above the $CaCO_3$ Equilibrium Curve deposit protective scales. Where the composition falls below the curve, the metal is exposed to the solvent action of the waters.

# NEW DEVELOPMENTS

*This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.*

**Oil Cooler** controls temperature of cutting oil, lubricating oil and hydraulic oil. The unit is designed for use with machine tools, to dissipate heat generated during operation, and maintain the most desirable temperature for longer tool life and more uniform work. Oil is pumped from machine tool oil sump through cooling unit and back to machine. Any standard commercial condensing unit can be used with the cooler. **No. 1154**

**Portable Hydraulic Cutter** for rod and bars up to 1 1/16 in. diameter, wire rope up to 1¼ in. and cable up to 3½ in. Cutting head is connected to hydraulic pump by 25 foot flexible hose. Head weighs 38 pounds and delivers 60,000 pound thrust. Electric motor or gasoline engine may be used for power. **No. 1155**

**Electric Counters** for light and heavy applications operate at 1,000 and 800 counts per minute respectively. Both models have 6 figure capacity, are resettable, and operate on 110 v, 60 cy a-c. They are totally enclosed for protection against dust and moisture. Voltage fluctuations are said to have no effect on their accuracy. **No. 1156**

**Metal Surface Protection** from flame spatter, arc, etc. is offered by new paste compound. It can be spread with welding flux over area to be protected, and the dried residue removed after welding operation. **No. 1157**

**Double-Cut Files** have staggered tooth design which operates on cutting rather than scraping principle. Overlapping teeth are said to provide a smooth cut, while undercut teeth provide faster removal of chips. Open gullets reportedly prolong file life. **No. 1158**

**Drilling and Countersinking Machine** features a foot-operated gear and rack mechanism which moves the opposed spindles in equal amounts through their maximum 1 in. of travel. Work is held in a fixture at the center of the machine, 4½ in. above the base plate. The two motor assemblies are bolted at various center distances on this plate. Maximum distance between chucks is 20 in. Motors are available for speeds from 900 to 3600 rpm., operating on 220 or 440 v, three phase a-c. **No. 1159**

**Portable Hardness Tester** will test rounds and flats to 4 in., reading in Rockwell A, B and C scales, from which Brinell equivalents can be figured. Equipment for the C-frame instrument includes a diamond penetrator, a 1/16 in. ball penetrator, a flat anvil, two V-anvils, an adapter and extension, two hard-steel test blocks, a brass test block, and hinged cover base. **No. 1160**

**Rotary Cutters** of tungsten carbide are available in ten shapes. Each shape is made in head diameters of ⅛, ¼, ⅜ and ½ inch. Heads are form ground concentric with the shanks for high speed and feed operation. **No. 1161**

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ference are not known with accuracy. Furthermore, since the heat developed by friction in the bearing is less at low than at high speed, the temperature must be lower and the average viscosity of the oil film higher at threading speeds. In the absence of data on the change of temperature with speed, this has not been taken into account; its effect would be to increase the oil film thickness at low speeds above the calculated values and reduce, at least to some extent, the magnitude of the change of the distance between roll axes from full speed to threading speed shown in Fig. 27. Again, as pointed out by J. H. Hitchcock, both the roll-neck sleeve and the bearing chock, and with the latter the bushings or brasses, deform under the pressure, changing the shape slightly from the perfect cylindrical form and producing a variation of unknown amount in the radial clearance around the circumference. In the author's opinion, the deformation probably acts in the direction of increasing the effective clearance in the region of highest pressure, but this is by no means certain.

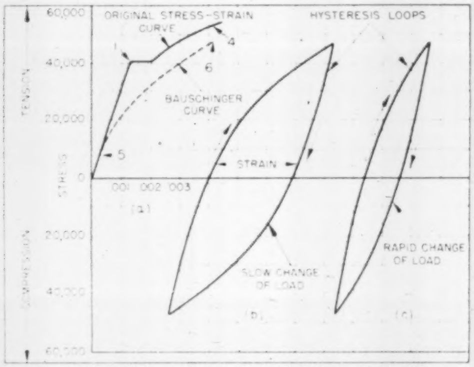


Fig. 29—Bauschinger effect and plastic hysteresis after repeated reversal of stress. (*b* and *c*, according to Popplewell[13])

**Requires Further Study**—While the preceding study has shown that under the assumed conditions the change of oil film thickness in the backup roll bearings could be large enough to account for the observed change of strip gage with rolling speed, it is not the entire explanation. That some other cause, of equal or greater importance, is acting in cold strip mills, is shown by the observation that increase of gage of finished strip occurs when the speed is decreased in mills having roller bearings instead of oil-film bearings. This was stated emphatically by several operators in separate discussions with the author; they say the mill becomes definitely "stiffer" at high speeds. They had no information as to the effect on roll pressures, however, as these mills were not equipped with roll force meters.

Ford[3], in the 2-high experimental mill at Sheffield when equipped with roller bearings, working with constant setting of the screwdowns, found that except for the first pass, both the gage of the strip and the roll force decreased with increasing speed, the drop of force amounting to about 13 per cent for a rise of strip speed from 12 to 155 fpm, with surfaces either lubricated or dry; and that thinner strip could be rolled at high speeds than at low speeds. He concluded that the length of contact of the strip on the rolls must change with speed, and that the roll contour must remain more nearly like its original circular form, the higher the speed.

**Cites Time Lag in Roll Deformation**—Mohler[39] has made a number of suggestions as to possible causes of the speed effect, some of which must be ruled out as contradicted by known facts, but others remain possible. The most plausible appeared to the author to be a time lag in the deformation of the rolls. A rough analogy would be that of a fast train rushing out on to a long bridge. The deflection of the bridge at any point does not reach a maximum immediately the locomotive reaches that point, but is delayed by the inertia of the bridge members, and then later reaches a value larger than the static deflection. (This is known as Willis' problem.)

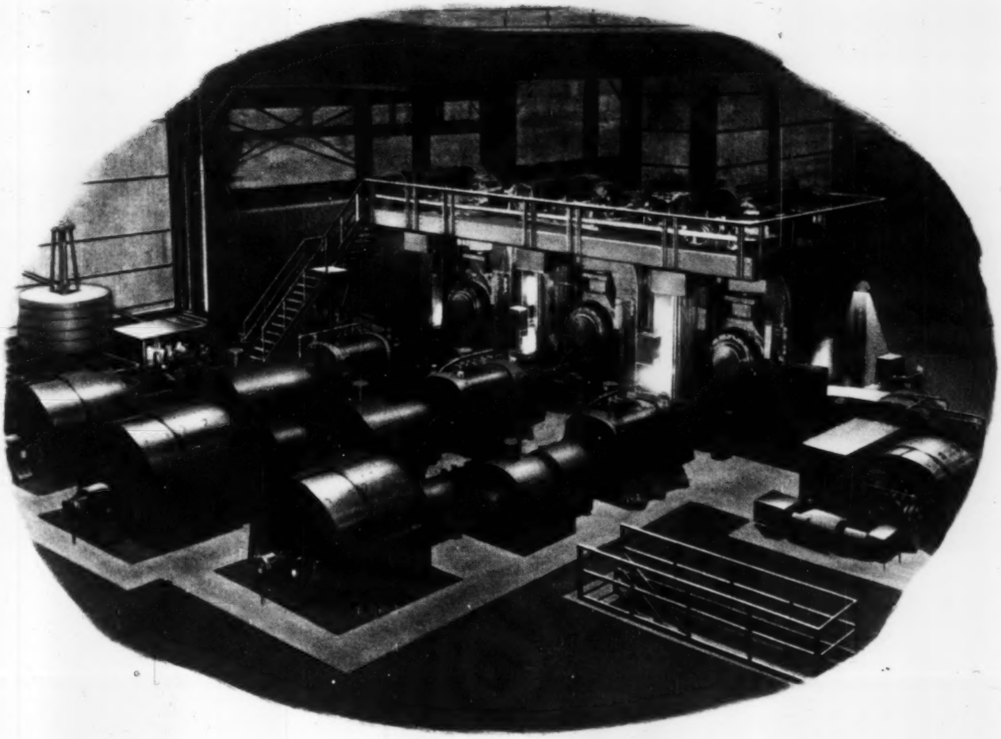
A brief calculation showed, however, that in the case of the rolls so far as *elastic* deformation is concerned, this could hardly be the explanation. In order that the place of maximum deformation of the roll surface should be displaced appreciably, a standing wave would have to appear on the roll surface, which would happen only if the rolling speed were of the same order of magnitude as the velocity of propagation of circumferential waves around the roll (Rayleigh waves.) The latter waves would travel at about 11,000 fps, whereas the strip speed does not, so far, exceed 100 fps or less than 1 per cent of the wave velocity.

Elastic hysteresis was considered as a possible explanation, but was ruled out because the magnitude of this effect seems to have been definitely proved to be independent of the speed of load change.

**Imperfect Elasticity May Play Important Part**—We must not forget that the strip material and the roll material are of the same kind, both having a dual nature, partly elastic and partly plastic. To exaggerate, it is somewhat like rolling dough to form a pie crust, using a rolling pin also made of dough (having stiffer consistency, of course.) The difference is that in the strip, the plastic deformation is of primary importance, but in the roll, the elastic features predominate; nevertheless, the other facet of the nature of each is sufficiently prominent to necessitate modifications in any simple theory of rolling.

Judging from Fromm's[40] study of rolling contact, it seems probable that in roller bearings the stress at the highest-stressed points almost always exceeds the elastic limit and even the yield point, and this is also likely in highly stressed mill rolls, as indicated by the observation that if the rolls when not turning are allowed to remain under pressure for any considerable time, a narrow longitudinal flat spot, corresponding to the surface of contact, develops in their surfaces and remains permanently.

**Yield Point vs Rate of Deformation**—It is also known that the yield point of steel is ordinarily raised somewhat by increasing the rate of deformation; and



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that high-strength steels such as those used for rolls are imperfectly elastic in the higher stress range. Stress-strain curves for such steel at various rates of deformation are lacking, but Morrison's[11] curves for 0.60 per cent carbon steel are shown in Fig. 28.

When the rolling occurs at high speed, the stress condition may correspond to point (1) in Fig. 28, which is still in the elastic range for the relatively high rate of deformation of the roll in the contact area. When the rolling speed is decreased to a small fraction of the former value, the stress condition would shift to point (2) on the solid-line curve corresponding to the lower rate of deformation. But since the total deformation would then be considerably increased, the contact length which at (1) corresponds to Hitchcock's equation would become proportionately greater, the friction hill would rise, and the stress would correspond to point (3) in Fig. 28. The roll pressure would be increased and the reduction of strip thickness would become less at the lower speed, which is just what was found by Ford.

The condition described would be accentuated by the Bauschinger-Ewing phenomenon, probably with plastic (as distinguished from elastic) hysteresis. Bauschinger[12] found that when steel which has a normal stress-strain curve such as (0) — (1) — (4) in Fig. 29-a is subjected to a number of reversals of stress to somewhat beyond the original yield point, from tension to compression and reverse, the stress-strain curve changes from the normal form to a curve resembling that of cast iron rather than steel, as indicated by the broken line (0) — (5) — (6) in Fig. 29-a, and the material then either has no definite elastic limit or one which is much lower than the original, as point (5). Thereafter, reversals of stress cause a plastic-hysteresis loop, and this is a time effect related to creep, for as shown by the tests of Popplewell[13], the hysteresis loop is wide when the load change occurs slowly, as indicated by Fig. 29-b, but becomes much narrower for rapid reversal of stress, as in Fig. 29-c.

*(To be continued)*

*Earlier installments of this series appeared in* STEEL *for Feb.* 19, *March* 5, 19, 26, *May* 14 *and July* 9.

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39. F. Mohler, *Sheet Metal Industries*, v. 14, 1940, p. 610.
40. H. Fromm, Zeits. angew. Math. u. Mech., v. 7, Feb. 1927, pp. 27-57.
41. J. L. M. Morrison, *The Engineer*, v. 158, 1934, pp. 183-185.
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43. W. C. Popplewell and H. Carrington, "Properties of Engineering Materials," Methuen, London, 1923, p. 499.

# Notched-Coil Rings Boost Brazing Output 62%

NOTCHED-COIL silver brazing and soldering rings are reported to have raised brazing output of electrical transformer connectors at one plant by 62 per cent over previous methods. The handling problem is eliminated and production raised from 360 to 560 assemblies per hour on the same gas-air heating unit.

Rings are wound from continuous wire in job-determined wire thicknesses and diameter according to individual specifications. The wound coil is then slotted along the outer diameter to permit fast, easy detachment of rings individually from the coil without tangling, distortion or breaking. Detaching ring from coil and placing it on the workpiece is performed in one operation.

Preforms are stress-relieved and made in gap form for easy compression into inner diameter grooves and in lap and butt form for keyed and nonkeyed outer surface applications. Rings are suitable for exacting applications where nature of the joint and depth and shape of groove limit the amount of silver alloy to be used. Specified wire thicknesses and diameters assure that only necessary measured amounts will be used, resulting in material savings and the elimination of post-brazing machining of spillage.

Notched-coil rings, developed and patented by the Lucas-Milhaupt Engineering Co., Cudahy, Wis., were used with an improvised gas-air heating unit set aside for development work. Using a mixture of 16 ounces of air pressure with natural gas, the heating unit consists of a 30-prong revolving fixture which is driven by a ½-hp motor through a hydraulic transmission at variable speeds up to 3 rpm. The brazing temperature, which is constant, determines the speed of the rotating work table. Speed, in turn, determines whether one or two operators are to be used.

Operator in background is detaching rings from the coil and placing them into transformer connectors as they revolve above the open gas-air jets. Assemblies need no preheating and are brazed when they complete the revolution. Operator in foreground removes finished assemblies and inserts new units for brazing

# Adequate Instrumentation

(*Continued from Page 69*)

systems may also be employed and here again conventional ammeter readings are valid only for those wave shapes having a substantially uniform magnitude.

The nonuniform wave shapes will probably come into more common usage in the future and steps should be taken to clarify the best means for recording, measuring, evaluating and describing the currents used for welding with these systems.

Several devices have been employed for measuring the product of some of the variables entering into the heat equation. These have included $I^2T$ indicators and watt-hour meters. These products cannot be indiscriminately accepted as an accurate evaluation of weld quality for several reasons. First, the energy required to make a given nugget is different for a short time weld than it is for a long time weld because of differences in thermal losses. Second, there is the matter of current flow path.

In the multiple welded joints, as ordinarily used in production, current tends to shunt through previously made welds and for this reason it is preferable to follow the procedure of using established and proof-tested schedules of the several variables for a particular weld spacing, while separately measuring all the variables except resistance, which is usually ignored only because no practical device exists for its measurement.

**Water Temperatures Checked**—For high-quality production, the cooling water flow rate temperatures should also be known. This requires a flowmeter and the use of a simple thermometer. Gages for check-up on air or hydraulic pressure sources or systems are also necessary. Force on the weld varies with line pressure for such machines and an erratic pressure source may tend to produce erratic weld quality. Availability of suitable pressure gages to permit the welding supervision to detect such sources of variation before they become a production problem is essential. The uniformity of the primary line voltage, which may be 440, 2400, or 3200 v, should be known since variation in that value will influence the magnitude of the secondary current delivered to the weld zone, for a given machine and control setting. For magnitudes over 750 v, a step-down transformer should be used with an electrically isolated secondary having one side grounded. For primary line current measurements, a current transformer and a pointer-stop ammeter should be used.

Resistance butt-welding involves the same electro-mechanical variables as does spot welding. Also seam welding offers the same problems and solutions except that here current flow is commonly continuous.

Variables in projection welding are the same as those for spot welding, except that here ability of the movable electrode to "follow-up" the collapse of the molten projection is important to success of the process. It is also common practice to weld several projections at one time and thus parallel current weld flow paths exist, effectively preventing the measurement of current within individual welds.

**Cycle Trace Recorders Available**—Current "flow" times may vary from ½ of one to several hundred cycles, depending upon material thickness. When using a current recording magnetic oscillograph in the laboratory, the time period is automatically visible on the face of the trace. With synchronous controls, current is initiated and terminated at the zero points of current, thus full cycles or half-cycles are always secured. For production checking and development purposes, direct recording cycle counters and cycle trace recorders are available.

The two basic measurable and controllable variables of manual arc welding are the arc current and voltage. Burnoff rate of electrode is a function of wattage. Production rate of welding, as well as quality of welded product, may be influenced to a certain extent by the magnitudes of that value. For each combination of base metal mass and disposition, and selected electrode, there is an optimum current operating range. Rough production welding is seldom controlled by the use of any instrument checkup. Even in those cases there is always available, however, in lieu of an actual ammeter, the criterion of using a predetermined electrode meltoff rate, in conjunction with a marked length of wire and a stop watch.

It is possible here with a known electrode characteristic to define an ampere as the amount of current that will melt a specific amount of electrode metal in unit time. It is desirable, however, to have reference ammeters and voltmeters available. Current flow is essentially continuous in arc welding, and the ammeter may be of three types: The dynamometer, d'Arsonval and the iron vane type. The range of currents may be from 5 to 1200 amp; one solution is to secure multirange instruments. This cannot be done without some sacrifice of accuracy.

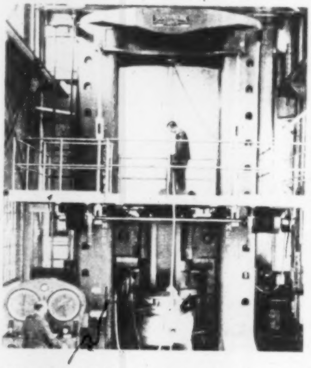
**Long Type Ammeter Useful**—A simple tong type ammeter is useful for checking individual station current values. No connections are required. Arc voltage must be measured from leads attached across the work and electrode holder as terminal points.

Both alternating and direct current ammeters and voltmeters may also be of the recording type. These are useful in training operators and in evaluating electrodes.

The magnetic oscillograph is useful for precise studies.

In the submerged metal-arc process, welds are produced under the protective blanket of a granulated flux. The wire feed is here electro-mechanically related to the arc voltage. Other variables are arc current (100-1500 amps), and carriage speed (10-299 inches per min). Commercial machines include panel ammeters and

## Progress in Extrusion Research



EXPERIMENTAL extrusion of aluminum in various shapes is one of the jobs now being done with Alcoa's hydraulic metalworking machine, a specially-designed Baldwin testing machine of 3 million pounds capacity. Extruded aluminum feeds upward through the center of the crosshead. The machine is 25 feet high and extends 15 feet below floor level. The loading cylinder has a stroke of 36 inches. Vertical screws in the two columns, turned by a 50-hp motor, provide for crosshead adjustment. Loads are measured by an independent hydraulic Emery cell in the crosshead and the Tate-Emery indicator at left in a cabinet with machine controls

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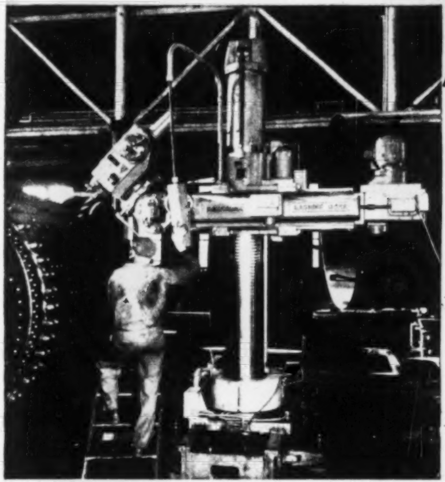
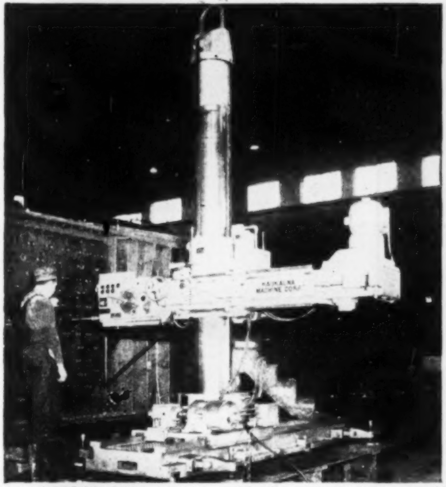
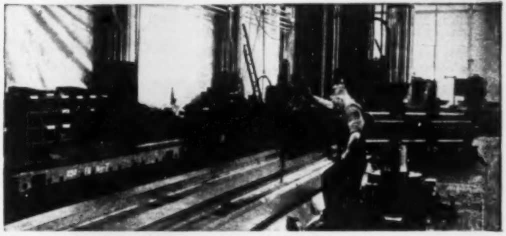


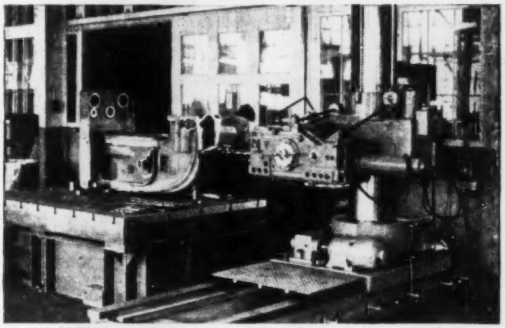
Model 125-U drilling and tapping angular holes in high pressure vessels using a 2¾" drill and a 2½" pipe tap.



Model 125-HR drilling, reaming and back spot facing holes in a 40 cu. yd. bucket.



Universal Machine drilling, tapping and doweling racks in place on floor type boring machine runways.



Model 1030 on production setup, drilling, boring and tapping horizontal holes in milling machine bases, columns, headstocks and tables.

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voltmeters, which should be checked periodically against standard meters.

**Helium-arc Process**—Within recent years, the tungsten-steel-argon arc or helium-arc process has found more applications within the steel industry. To describe procedures so that results may be duplicated, one must specify, in addition to type of equipment and joint preparations, the following:

| VARIABLE | INSTRUMENT |
|---|---|
| Electrode diameter | Micrometer |
| Gas flow rate | Flowmeter |
| Gas purity | Mass spectrometer |
| Travel speed | Rule and stop-watch or tachometer |
| Open circuit voltage | Voltmeter |
| Arc voltage | Voltmeter |
| Arc current | Ammeter |

Additionally, operators are interested in knowing whether or not the arc was steady under the conditions employed. For such studies a high speed cathode ray type oscilloscope is useful, particularly the dual beam type.

For the permanent record it is necessary to photograph the screen image. The newer direct printing camera facilities are expected to be a boon to the welding instrumentation and study field.

Still, normal motion and high speed motion cameras for detail arc action studies are also very useful, particularly when and if synchronized with oscilloscopic recordings. For best results, intense external light sources are required.

In arc welded production, preheating is sometimes specified to retard cooling rate, reduce hardness and minimize the likelihood of cracking. For checking preheating temperatures various makeshifts can be used as the low temperature melting point wires of different analyses; prepared compositions in pencil form which melt at known temperatures; or direct reading pyrometers. Such instruments may be periodically recalibrated against a furnace under accurate control. Stepless ranges up to 1200° F, which are adequate for the purpose, are available.

**Gas Welding and Brazing**—In the gas processes, wherein the heat is derived from the combustion of a fuel gas in the presence of air or oxygen, essentially no instrumentation is involved. Pressure regulators and torches for applying the flame and for adjusting the mixture of the gases desired are usually considered to be in the equipment and not the instrument category. These units do involve built-in pressure gages, upon which the operator depends for guidance on the relative volumes of the two gases supplied to the mixing chamber and upon the continued availability from the primary source, which may be a pipe line or a pressure tank. The trained operator can tell from flame appearance whether an oxidizing, neutral or carburizing flame is being applied.

In the thermit processes, wherein the heat is derived from the exothermic chemical reaction between iron-oxide and aluminum, no instrumentation is involved under ordinary operating conditions.

## New Facilities in Production

TEN jig grinders go through final assembly and inspection in a section of the new $250,000 addition to Moore Special Tool Co.'s plant in Bridgeport, Conn. The 15,000 square foot area increases by 25 per cent the company's facilities for producing jig grinders, jig borers, wheel dressers and other precision equipment

## Improved Crane Electrification

New type electrification for overhead cranes and tramrail systems especially designed to provide maximum safety is announced by Cleveland Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, O. The development was planned and carried out in anticipation of a possible ruling in the near future by the National Electric Code, making it mandatory to have adequate protection of electrification on overhead materials handling equipment.

A result of several years of research and preparatory work, the new electrification has undergone extensive tests by the producer and also various hard-service applications in a number of well-known manufacturing plants.

Known as Tramrail Saf-Powr-Bar, the development consists of inverted U-shaped conductor bars with internal sliding current collector shoes which prevent accidental contact with the electrified conductor bar. This arrangement may be applied to all new Tramrail systems, as well as replacement on open-bar electrification. It may also be installed on many hand-propelled systems where motor-powered hoists, carriers, or cranes are now desirable.

## CALENDAR
### OF MEETINGS

*Denotes first listing in this column.*

**July 30-Aug. 2, American Electroplaters' Society:** Annual convention, Statler Hotel, Buffalo. Society address: P.O. Box 168, Jenkintown, Pa.

**August 20-23, American Institute of Electrical Engineers:** Pacific general meeting, Multnomah Hotel, Portland, Oreg. Institute address: 33 W. 39th St., New York 18.

**August 20-23, National Association of Power Engineers Inc.:** Annual meeting and exhibit, Hotel Plaza, San Antonio, Tex. Association address: 176 W. Adams St., Chicago 3.

**✦September 3-7, American Chemical Society:** Annual meeting, Hotel Statler, Washington. Society address: 1155 16th St. NW, Washington 6.

**✦September 4-6, Liquefied Petroleum Gas Association:** Pacific Coast convention, Fairmont Hotel, San Francisco. Association address: 11 S. La Salle St., Chicago 3.

**✦September 5-7, American Hot Dip Galvanizers Association Inc.:** Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 2311 First National Bank Bldg., Pittsburgh.

**✦September 6-7, Rail Steel Bar Association:** Semi-annual meeting, The Broadmoor, Colorado Springs, Colo. Association address: 38 S. Dearborn St., Chicago.

**✦September 8-9, New York; September 14-15, Washington, International Union of Pure and Applied Chemistry:** Annual meeting.

**✦September 10-13, International Congress of Pure and Applied Chemistry:** Annual meeting, New York.

**✦September 10-14, International Foundry Congress:** Brussels. Congress address: General secretary, Foundry Congress, c/o Fabrimetal, 17 Drapiers St., Brussels.

**✦September 10-14, Instrument Society of America:** National instrument conference & exhibit, Sam Houston Coliseum, Houston. Society addzess: 921 Ridge St., Pittsburgh 12.

**✦September 10-15, Annual Industrial Engineering Conference:** Mechanical Dept., Industrial Engineering Division, Michigan State College, E. Lansing, Mich.

**✦September 11-13, Society of Automotive Engineers:** Tractor meeting, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York.

**✦September 14-16, American Society of Sanitary Engineering:** National convention, Hotel Statler, Detroit. Society address: 1308 Freemont St., McKeesport, Pa.

**✦September 17-19, Allied Railway Supply Association:** Fall meeting and exhibit, Hotel Sherman, Chicago. Association address: Box 5522, Chicago 80.

**✦September 21-23, National Association of Waste Material Dealers Inc.:** Fall meeting, Saranac Inn, Upper Saranac Lake, N. Y. Association address: 1109 Times Bldg., New York 18.

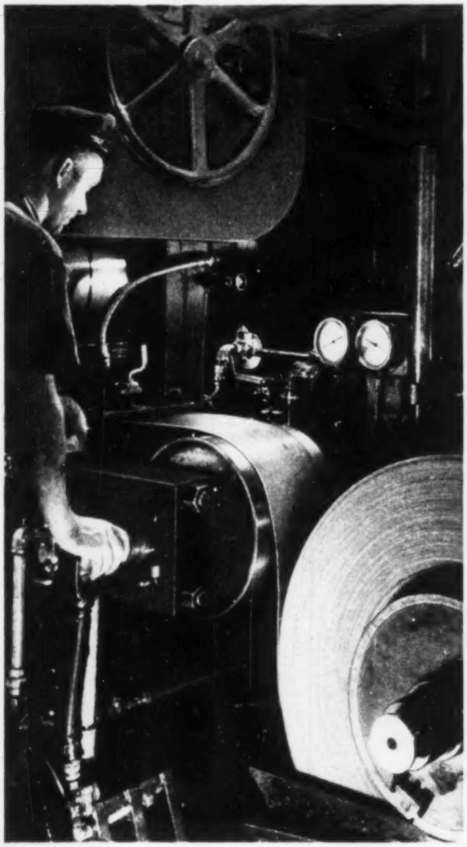
**✦September 24-25, Steel Founders Society of America:** Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland 20.

**✦September 24-25, American Coke & Coal Chemicals Association:** Annual meeting, Skytop Lodge, Skytop, Pa. Institute address: 711 14th St. NW, Washington.

**✦September 24-26, National Truck Body Mfrs. & Distributors Association:** Annual convention and suppliers exhibit, Haddon Hall, Atlantic City, N. J. Association address: 346 Connecticut Ave. NW, Washington.

**✦September 25-28, American Society of Mechanical Engineers:** Fall meeting, Hotel Radisson, Minneapolis. Society address: 29 W. 39th St., New York.

# SPRING STEEL



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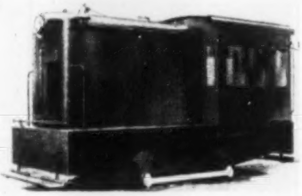
NILES, MICHIGAN

# New Products and Equipment

## Torque Converter Locomotives

A series of diesel powered industrial locomotives with torque converter is announced by Davenport Locomotive Division, Davenport Besler Corp., Davenport, Iowa. Units are available in a range of gages and sizes to meet requirements of individual operating conditions and may also be gasoline engine equipped.

Unit illustrated is 20-ton capacity, 24 gage and is equipped with a No. 6080 General Motors diesel and an Allison torque converter. Benefits resulting from using a torque converter include: Smooth transition from one speed level to another, transmission is freed from load shocks or jerks which make for wear and tear on mechanical parts and greater work output.



**Check No. 1 on Reply Card for more Details**

## Safe Dump Trailer

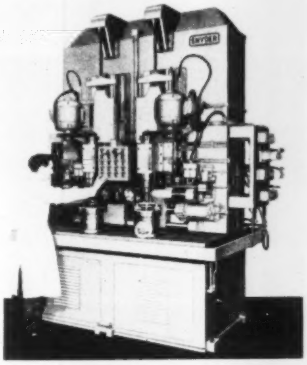
A self-dumping 1 cubic yard-capacity trailer is added to its line by Phillips Mine & Mill Supply Co., 2309 Jane St., Pittsburgh 3, Pa. Model SRF-1 features a self-dumping hopper, held to prevent accidental dumping by a safety lock with a safety catch. Balance of the hopper is such that when the lock is released the hopper dumps its load and then returns to the loading position. Lock then automatically engages holding hopper in place. Without danger of tipping over, it can be dumped from a fork lift truck in the elevated position.

Design includes rubber tired and castered rear wheels, permitting trailer to be pushed easily by one man. It is built of heavy gage steel with rolled edges to prevent injury to personnel or load. Trailer is suitable for hauling and unloading scrap, castings, stampings, wire and other bulky metal pieces.

**Check No. 2 on Reply Card for more Details**

## Precision Boring and Facing

Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich., has built an automatic duplex machine for precision boring and facing end shields for fractional horsepower electric motors. Operation consists of finish turning and facing rabbet on the outside diameter of the aluminum body and finish boring the inside diameter of the hub bushing which may be either steel or babbitt. Production ranges from 210 to 338 pieces per hour at 75 per cent efficiency.



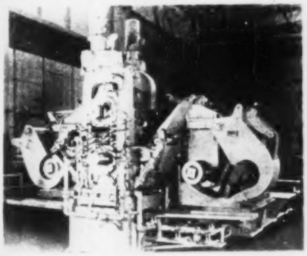
Power is supplied by two 1-hp 600 rpm chuck motors and 2¾-hp, 1800/900 rpm spindle motors. Spindles are driven through V-belts which allow variation in spindle speeds. Present spindle speed is 4778 rpm and chuck speed is 334 rpm. Clamping is automatic by means of spring diaphragm while unclamping is accomplished by hydraulic return of the diaphragm.

**Check No. 3 on Reply Card for more Details**

## Integrated Package Mill

Small, compact and versatile all-purpose mill for cold rolling of narrow, thin strip, is a development of United Engineering and Foundry Co., 948 Duquesne Way, Pittsburgh 22, Pa. Each unit is furnished fully equipped with roller bearing mounted rolls, recirculating coolant system, mill guides, tension reels, belt wrappers if desired, strippers and drives; all mounted on a fabricated base which serves as a rolling coolant reservoir and lubricant reservoir. All drive motors also are mounted on single fabricated base and no cellars or elaborate foundations are needed for its installation.

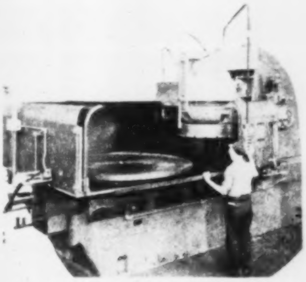
Package mill comes in three sizes: 2 and 10 x 10 inches, 3 and 16 x 16 inches, and 4½ and 22 x 22 inches. It is designed to roll copper, brass, aluminum, low carbon, high carbon and stainless alloy steels at speeds of 500 to 2000 feet per minute, starting with thicknesses of 0.030 to 0.050-inch and finishing to 0.002 to 0.004-inch. Unit can be furnished for either one way rolling or for reversing service. It can be equipped with motorized or hand screwdowns, either with sleeve type or collapsing mandrels.

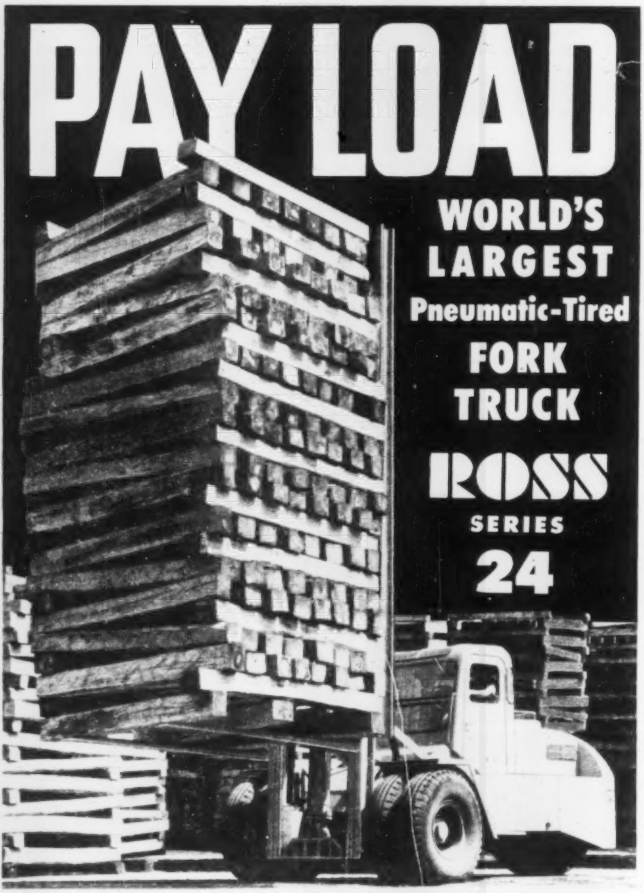


**Check No. 4 on Reply Card for more Details**

## Massive Grinder

Rotary table, vertical spindle surface grinder made by Blanchard Machine Co., 64 State St., Cambridge 39, Mass., is equipped with a chuck, or table, fully magnetic to 72 inches in diameter. The 6-inch wide nonmagnetic area gives a total table diameter of 84 inches. The rotary table is





HANDLES LOADS WEIGHING 26,000 LBS. - 72" WIDE

•

SPEEDS HANDLING OF BILLETS, BARS, IN-PROCESS AND FINISHED MATERIALS

•

HUGE 14.00-20 TIRES, PLENTY OF WEIGHT ON DRIVING WHEELS - MINIMUM YARD SURFACING REQUIRED

•

TAKES TOUGHEST OPERATING CONDITIONS IN STRIDE

•

You'll want full details on this giant fork truck . . . designed to further speed mass handling of heavy materials and reduce costs even more. Write today.

Rely On ROSS

THE ROSS CARRIER COMPANY
*Direct Factory Branches and Distributors Throughout the World*
450 Miller St., Benton Harbor, Michigan, U.S.A.

machined from one solid steel disk.

Wheel spindle, which carries a 42-inch diameter abrasive wheel, can be equipped with either a 75 or 100 hp built-in electric motor. Overall width of grinder is 10 feet 7 inches and overall height is 20 feet. Weight is over 30 tons.

**Check No. 5 on Reply Card for more Details**

## Swiss Milling Machine

Carl Hirschmann Co., 30 Park Ave., Manhasset, N. Y., announces it is adding the Swiss milling machine made by Schaublin Ltd. to its stocks. The machine supplements the lathe made by the same company and is so designed that many of the lathe attachments are usable on it interchangeably.

Identified as the type SV 12 high precision milling machine, it had its origin in the precision and speed requirements of the toolroom where wide work range must be provided without great accessory cost. Special devices that adapted it as a production machine will be carried in stock. Six horizontal cutterhead speeds range from 130 to 1460 rpm. and vertical cutterhead speeds range from 160 to 1800 rpm. Power is provided by 1.2-hp motor. Space required is 36 x 30 x 63 inches.

**Check No. 6 on Reply Card for more Details**

## Tube Crack Detector

Cracks and crack-shaped flaws in ferromagnetic tubular products are detected and recorded pictorially with the automatic crack detector made by Graydon Smith Products Corp., 150 Causeway St., Boston 14, Mass. The inspection device travels through the bore of tubes, detecting and recording both surface and subsurface flaws, cracks, seams, flakes, inclusions and other discontinuities. The magnetic principle used does not limit this type of inspection to tubular products.

In operation, the inspector inserts the head into a magnetized tube, turns on a switch at the recording cabinet which starts the head through the tube and examines the facsimile

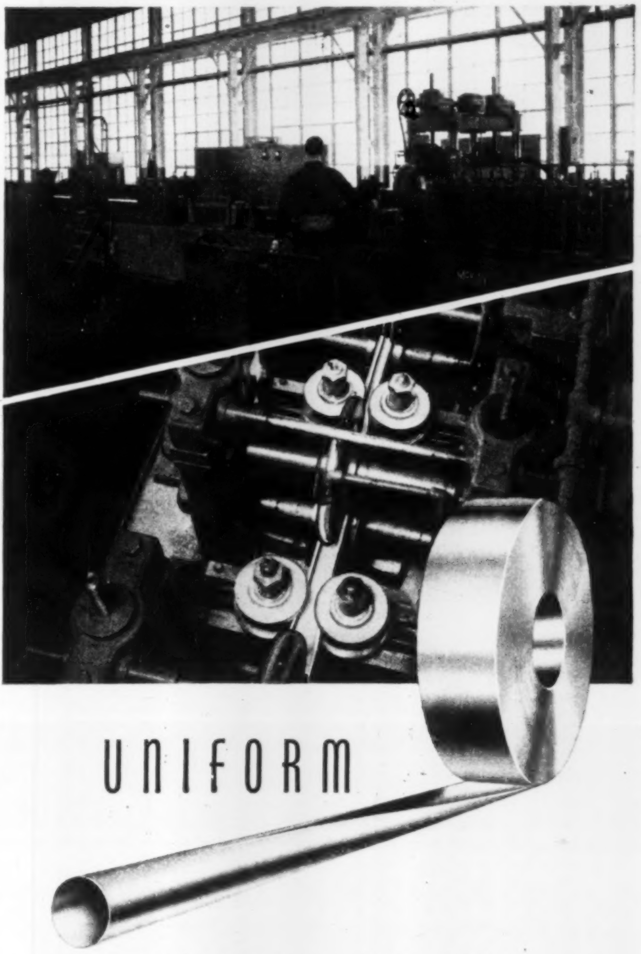
paper chart emerging at a rate proportional to the travel of the head through the bore. What he sees is equivalent to a scale photograph of the developed bore surface with cracks standing out clearly. Sensitivity is adjustable to eliminate negligible flaws on the record. Speed of testing is dependent on the minimum size of flaw to be detected. For example, cracks ¼-inch long in a 4-inch diameter tube require speeds around 4 linear feet per minute. A 1-inch crack would show up well at 15 linear feet per minute.

Check No. 7 on Reply Card for more Details

## Steel Bath Temperatures

Immersion thermocouple equipment announced by Leeds & Northrup Co., 1934 Stenton Ave., Philadelphia 44, Pa., consists of a platinum—platinum 10 per cent rhodium immersion couple and a Speedomax pyrometer with [illegible] features. Thermo- [illegible] mounted in a refractory- [illegible], supplied in lengths [illegible] 12 feet. Fused silica protective tip can be replaced in a few seconds and a reserve supply of platinum wires is located in the tube. To replace the element, the operator loosens two clamps, pulls out wire for new junction and replaces refractory tip, all without disassembling unit.

Recorder operates a set of three signal lights, usually located near the furnace. Green light stays on as



Newly built and newly equipped, Wallingford's tubing mill is as modern as today. This equipment, operated by men of experience, using Wallingford strip steel of consistently high quality, produces tubing that in analysis, tolerance and finish can be counted on to be uniform at all times. This complete dependability provides savings in fabrication. Less down time, fewer rejects, and a finished product of constant quality is assured with Wallingford uniform tubing.

THE WALLINGFORD STEEL CO.

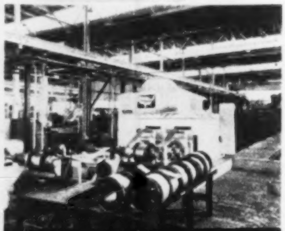
SINCE 1922

WALLINGFORD, CONNECTICUT, U.S.A.
LOW CARBON · HIGH CARBON
ALLOY · STAINLESS · STRIP and TUBING

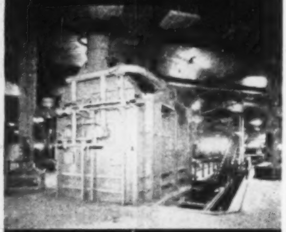
The over-all job in

Production Lines
and Special
Automatic Machines
by
CONTINENTAL

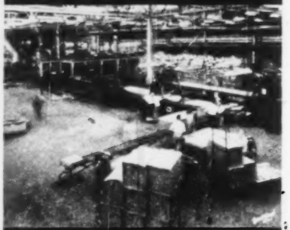
for military production...



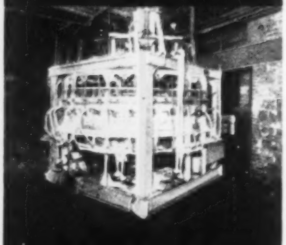
Continental Automatic Strip Production Line consisting of annealer, pickling machine, dryer, and coiler.



Continental Special Automatic Pig Molding Machine complete with automatic charging, melting, and pouring.



Continental Automatic Production Line operating from raw materials to completely finished and packed product. This production line consists of fifteen integrated, synchronized, special automatic machines.



Continental Special Automatic Glazing Machine complete with automatic press synchronizer and fire polisher.

For maximum production of military items manual operations must be eliminated. With CONTINENTAL Special Automatic Machines and Integrated Production Lines production goes on in a continuous flow with better, more uniform products with a minimum of man hours.

CONTINENTAL jobs begin with analysis of the requirements, then the selection and development of proper methods for greatest results. Finally follows the design, the building, and the installation of the machines—delivering a COMPLETE UNITIZED PRODUCING PACKAGE with results guaranteed.

The broad experience of CONTINENTAL offers you a prompt, sure solution to your change-over program.

CONTINENTAL INDUSTRIAL ENGINEERS, INC.
176 W. Adams Street, Chicago 3, Illinois
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PLANNED MILITARY PRODUCTION. Write for Booklet No. 127.

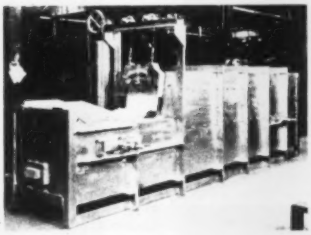
FURNACES
PRODUCTION LINES
CONTINENTAL
SPECIAL MACHINES
COMPLETE PLANTS
MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

long as the thermocouple circuit is closed. Amber light, which comes on whenever the recorder pen moves upscale, shows that the couple is in operating condition. Red signal indicates when the couple registers actual bath temperature; it tells the operator when to withdraw the couple without need for him to watch pyrometer's record.

Check No. 8 on Reply Card for more Details

## Wrenches Heat Treated

A continuous electric furnace for the heat treatment of wrenches has been designed by Bellevue Industrial Furnace Co., 2620 Crane Ave., Detroit 14, Mich. Since the belt is entirely enclosed within the heating zone there is a minimum of heating loss and operating cost is kept low.



Water or oil may be used as the quenching agent. Production is 800 pounds per hour.

Check No. 9 on Reply Card for more Details

## Current Surges Eliminated

Bulletin 736, an alternating current part winding starter, for use with motors which employ two separate parallel windings, star or delta, to obtain increment starting is announced by Allen-Bradley Co., Milwaukee 4, Wis. It consists of two A-B across-the-line starters and a pneumatic timing mechanism mounted below one starter and operated by the starter's solenoid plunger.

Pressing this button immediately closes the first starter which energizes one of the two parallel windings. The timer goes into operation and after a few seconds energizes the second starter. With both starters closed, full line current is supplied to the motor through both windings, each using 50 per cent of the total current drawn. Use of part winding starting does not produce objectionable current surges obtained with autotransformer starting as the motor is not disconnected from the line during the starting period. Whenever reduced voltage starting is necessary

**OUTSIDE: It's a beauty** Extra-heavy Streamlined MONITOR-TYPE CAB! 360° visibility! All controls conveniently located; all machinery fully protected from the weather, yet accessible. New CLEAR VISION BOOM. 14 inch safety clearance between car body and upper works.

**BROWNHOIST Diesel Electric Locomotive-Cranes combine good exterior design with many basic mechanical improvements.**

**INSIDE: It's really engineered** New DYNAMATIC CLUTCH gives smooth, sensitive 32-step control, banishes slippage, eliminates torsional impulse and vibration. Safe FRICTION CLUTCH BOOM HOIST driven by worm and wheel in oil bath. Twin-barrelled, extra-large boom-hoist drums take all line in one layer. New Wide-faced Hoist Drums mounted on roller bearings with air cylinder mounted within the drum. ELECTRIC ROTATION and electric travel reduce maintenance to a minimum. Optional features include 8-WHEEL CHAIN DRIVE for increased drawbar pull and TWIN ENGINE DRIVE where greater tractive effort is required.

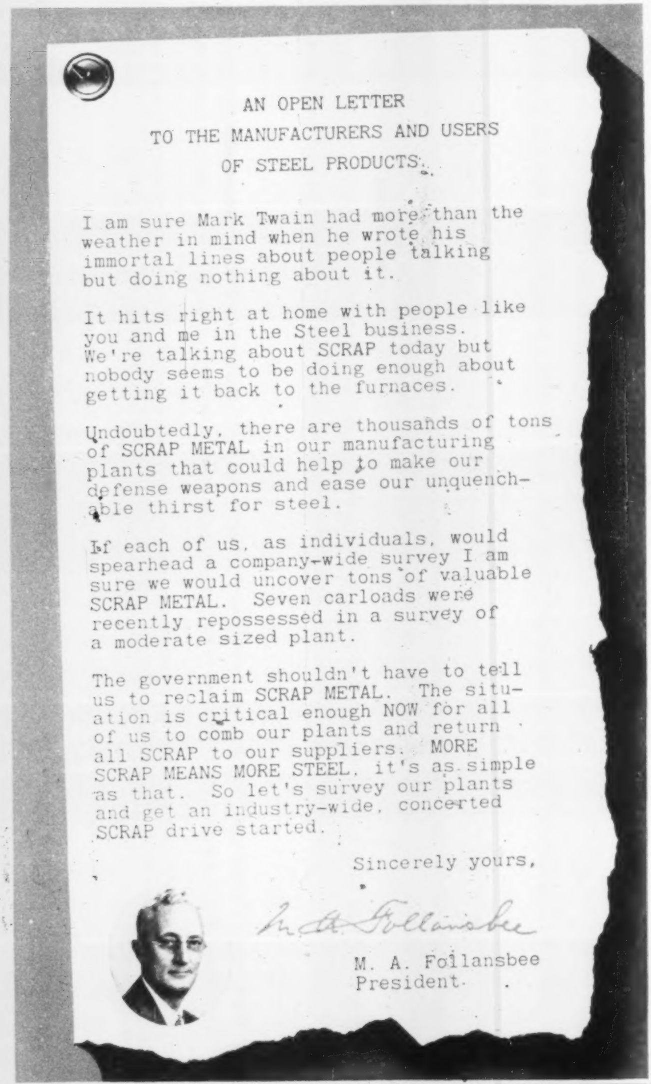
147

**BROWNHOIST**

**INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN**

**DISTRICT OFFICES:** New York, Philadelphia, Cleveland, Chicago, San Francisco, Canadian Brownhoist, Ltd., Montreal, Quebec. **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles

more scrap means more steel!



AN OPEN LETTER
TO THE MANUFACTURERS AND USERS
OF STEEL PRODUCTS.

I am sure Mark Twain had more than the weather in mind when he wrote his immortal lines about people talking but doing nothing about it.

It hits right at home with people like you and me in the Steel business. We're talking about SCRAP today but nobody seems to be doing enough about getting it back to the furnaces.

Undoubtedly, there are thousands of tons of SCRAP METAL in our manufacturing plants that could help to make our defense weapons and ease our unquenchable thirst for steel.

If each of us, as individuals, would spearhead a company-wide survey I am sure we would uncover tons of valuable SCRAP METAL. Seven carloads were recently repossessed in a survey of a moderate sized plant.

The government shouldn't have to tell us to reclaim SCRAP METAL. The situation is critical enough NOW for all of us to comb our plants and return all SCRAP to our suppliers. MORE SCRAP MEANS MORE STEEL, it's as simple as that. So let's survey our plants and get an industry-wide, concerted SCRAP drive started.

Sincerely yours,

M. A. Follansbee

M. A. Follansbee
President

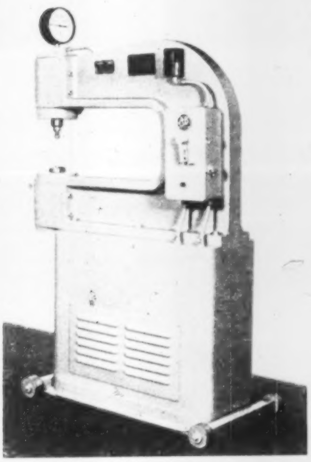
FOLLANSBEE STEEL CORPORATION
GENERAL OFFICES, PITTSBURGH 30, PA.
COLD ROLLED STRIP • POLISHED BLUE SHEETS
SEAMLESS TERNE ROLL ROOFING
*Sales Offices*—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants*—Follansbee, W. Va.
FOLLANSBEE METAL WAREHOUSES
Pittsburgh, Pa. • Rochester, N. Y. • Fairfield, Conn.

because of power company limitations and only two increments of starting are needed, the starter and a part winding motor can be used.

**Check No. 10 on Reply Card for more Details**

## Deep-Throated Hardness Tester

A Brinell hardness testing machine incorporating a throat depth of 24 inches is announced by Steel City Testing Machines Inc., 8843 Livernois, Detroit 4, Mich. Model AP-1 is a C-frame machine mounted on wheels. Lower anvil is the top of a hydraulic piston which rises as the load is applied to take pressure off the conveyor. Machines are made to order so that anvil height will conform to customer's conveyor height. Maximum vertical opening between ball penetrator and anvil is 4 inches.



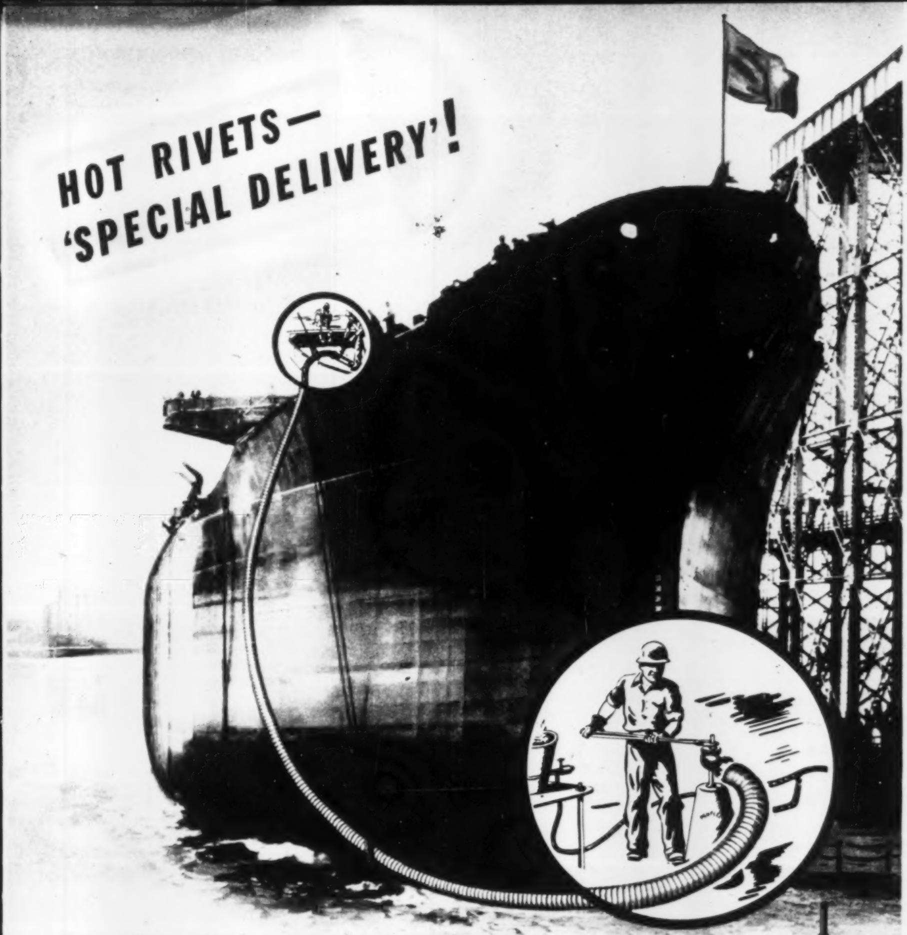
Operating cycle is controlled by a snap switch that applies a 3000 kilogram load in the on position and releases the load in the off position. Hydraulic unit is located in the base which supports the C frame. Overall dimensions are approximately 41 inches deep by 19 inches wide and the height depends on anvil height specified. Weight is approximately 900 pounds.

**Check No. 11 on Reply Card for more Details**

## Hack Saw and Drill Combined

Flipping a button converts the Trade Master unit made by P & L Products Co., Greenville, O., into either a hack saw or drill. When operated as a saw, regular hack saw blades can be used or the manufacturer can furnish blades prepared for special material or work. When op-

# HOT RIVETS— 'SPECIAL DELIVERY'!



## Penflex Pneumatic Rivet Passer Speeds Rivet Delivery, Cuts Passing Costs 20%!

Hot rivets delivered at high speeds around corners, curves, five stories up, or straight down with the Penflex Pneumatic Rivet Passer! Proved on-the-job for speed, economy and safety. Rivet travels fast through special Penflex All-Metal Rivet Hose. Corrugations provide ideal tumbling barrel for rivets delivered hot and free from scale.

Many Penflex units now in use in shipyards, on bridge construction projects, and by plate and structural fabricators. Find out today how the Penflex Pneumatic Rivet Passer can speed up fabricating work and create better profits for you. Write for your copy of the Penflex Pneumatic Rivet Passer folder. Address Dept. RP1.

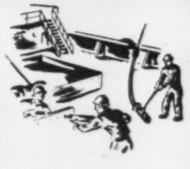
PENFLEX
PNEUMATIC
RIVET PASSER

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219
Powers Lane, Philadelphia 42, Pa. • *Branch Sales Offices:*
Boston • New York • Cleveland • Chicago • Houston • Los Angeles

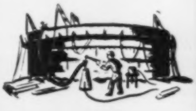
**Penflex**

**HEART OF INDUSTRY'S LIFE LINES**

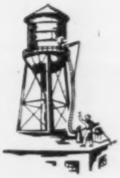
Copyright 1951 Penna. Flexible Metallic Tubing Co., Inc.



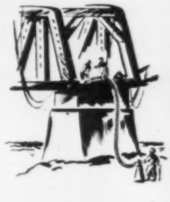
Penflex Pneumatic Rivet Passer permits forge to be placed a long distance away from riveting area. Prevents noxious fumes and gases from entering confined quarters.



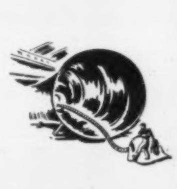
Riveter may be located around a sharp curve or out of sight, yet rivet finds its exact mark every time.



Accidents eliminated. Getting hit with misguided hot rivets cannot occur with unit. Metal hose transmission protects workers in area.



Penflex Pneumatic Rivet Passer is ideal for difficult-to-reach areas in riveting. Forge can be located more than 150 feet away from riveter.



Work is made easier in cramped or inaccessible areas with the Penflex Pneumatic Rivet Passer.

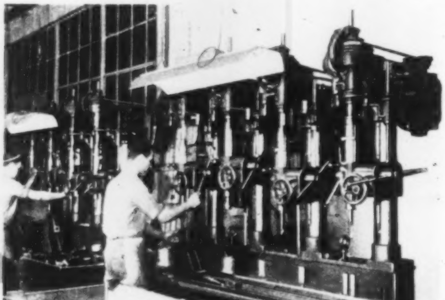
HOW THE AMERICAN METER COMPANY *Stepped Up* REGULATOR OUTPUT

"Buffalo" NO. 22 DRILLS

It takes a lot of accurate drilling, reaming and tapping to produce those high-quality regulators at the Erie Plant of the American Meter Company! Above, you can see how the problem has been handled—with single and multiple spindle "Buffalo" No. 22 Drills. Here a maximum number of operations are performed simultaneously, with minimum set-up time. Below, operator in foreground performs a tapping operation on a regulator with one of the four-spindle No. 22 Drills. Note the overall rugged construction (spindle diameter is 1.312", column diameter is 5.5"). Controls are easily reached. Let these accurate machines solve your drilling problem!

WRITE FOR BULLETIN 2989-F

Enjoy Maximum Production at LOW Cost with...
Buffalo
No. 22
Drilling Machines



**BUFFALO FORGE COMPANY**

158 Mortimer St. Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING CUTTING SHEARING BENDING

erated as a drill, the saw guide is turned down and a drill up to ¼-inch is inserted.

Other uses are as a flex sander or as a filing machine when rigidly supported. Mounted, the unit can be used as a drill press or jig saw and still have the feature of portability for other jobs.

Check No. 12 on Reply Card for more Details

## Power in Small Package

Model 50 Unitow industrial tractor made by Hensel Green & Co., 9 S. Clinton St., Chicago 6, Ill., can tow 100 tons on the level with 5000 pound drawbar pull. It is 102 inches long and 65 inches wide with a 118-inch turning radius permitting it to navigate narrow plant aisles, shipping docks, etc.

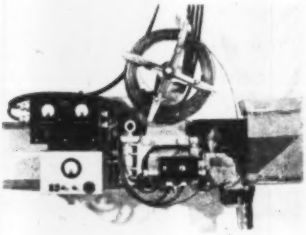
Tractor is 66 inches high to top of steering wheel and can pass under low obstructions. Dual pneumatic tractor tread drive wheels with smaller pneumatic tired front wheels enable it to do short turning and smooth navigating over poor pavements and floors.

Check No. 13 on Reply Card for more Details

## Welds Straight-Line Seams

Uniform welding of straight-line seams in light to heavy plate can be at high speeds with the UE-48 welding machine designed by Linde Air Products Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. It is intended for welding in permanent production installations and consists of a CM-48 side beam carriage, a welding head, small rod reel, Unionmelt feed hopper and controls. Equipment is mounted on the steel frame of the carriage which rides a cold-rolled steel track.

Welding current carriage speed, welding voltage and the Unionmelt material flow can be adjusted before welding is begun. An accurate electronic governor controls the speed of the carriage permitting a stepless speed range of from 3 to 200 inches per minute. After controls are adjusted for the desired welding conditions, operator switches the machine on and it proceeds to weld without further attention. Metal from 16-gage to 1½ inches thick can be welded with a single pass. Head can be positioned at right angles to the track or parallel to it. It can be adjusted to make any type of butt or fillet weld.



Check No. 14 on Reply Card for more Details

## Portable Pyrometer

Low temperature model, portable pyrometer is announced by the Claud S. Gordon Co., 3000 S. Wallace St., Chicago 20, Ill. Type LT-840 Xactemp is a self-contained instrument for rapid temperature determination below 800°F. An integral handle makes it convenient to use in any position and a choice of four calibrations allows the most effective use of the scale range.

Available for use with the instrument are two needle thermocouples, a ribbon thermocouple, a surface tip thermocouple and other specially designed thermocouples and extension arms. They are readily interchangeable and, without any adjustments or recalibration of the instrument, quickly ready it for measuring the surface temperature of stationary and revolving rolls, flats and irregular surfaces of molds, dies, etc.

Check No. 15 on Reply Card for more Details

## Protective Coating for Metals

Powerfilm, a rust and corrosion preventive coating for metal surfaces, is available from Thomas Co., Minneapolis 3, Minn. It gets under the surface and displaces any moisture present. When brushed, sprayed or wiped on, the coating dries to form a tough, nonoily protective film that will not crack or chip, or collect dust or dirt.

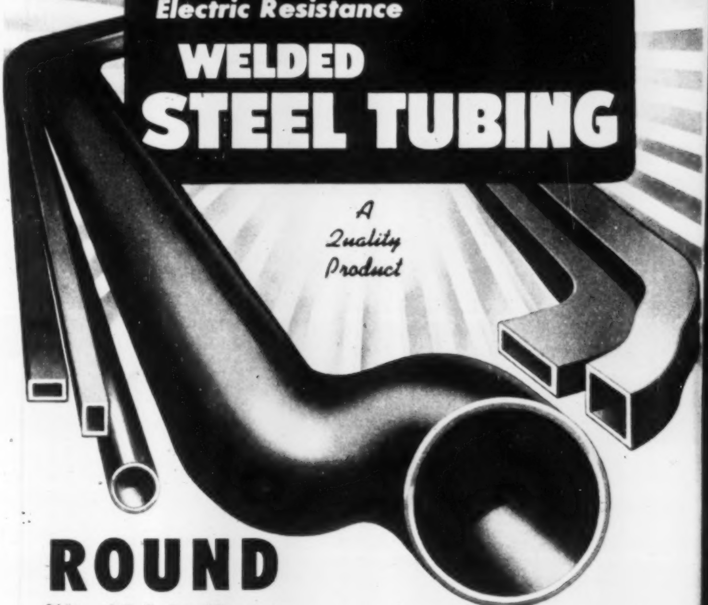
Check No. 16 on Reply Card for more Details

## Odorless Emulsion Cleaner

FO-106 solvent emulsion cleaner, developed by Aviation-Industrial Chemical Division, Fine Organics Inc., New York 3, N. Y., is a concentrate

The ABC of MST
ALWAYS MAKES POSSIBLE
BETTER PRODUCTS
AT LOWER COST

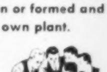
Michigan
Electric Resistance
WELDED
STEEL TUBING



A Quality Product

ROUND
3/8" to 4" O. D. 9 to 22 gauge
SQUARE-RECTANGULAR
1/2" to 2" 20 gauge, 1" to 2¾", 14, 16, 18 gauge
Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.



Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Design for Defense

Design and other advantages inherent in the use of electric resistance welded steel tubing resulted in its adaptation to hundreds of widely different weapons and materials for the armed forces during World War II.

These same advantages of design and adaptability make the contribution of Michigan tubing to the present defense effort a most important one, for reasons of fast, economical production. Problems of application to such items as automobiles, trucks, guns, bombs, etc., can be readily solved by consultation with Michigan engineers.

Michigan's facilities are at the disposal of manufacturers who are engaged in defense work, as well as those who wish to produce better consumer products at lower cost by the use of Michigan tubing.

ELECTRIC RESISTANCE WELDED STEEL TUBING
Michigan STEEL TUBE PRODUCTS CO.
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DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis Miller Steel Co., Inc., Hillside, N. J. C. L. Hyland, Dayton, Ohio Dirks & Company, Portland, Oregon James J. Shannon, Milton, Mass. Service Steel Co., Los Angeles, Calif. American Tubular & Steel Products Co., Pittsburgh, Pa. Strong, Carlisle & Hammond Co., Cleveland, Ohio Globe Supply Co., Denver, Colorado W. A. McMichaels Co., Upper Darby, Pa. A. J. Fitzgibbons Co., Buffalo, N. Y.

that is diluted with kerosene or stoddard solvent. It is applied to metal, concrete or painted surfaces by brush or spray, then rinsed off with cold or hot water. No oily film remains; dirt and grease are emulsified and carried off in the rinse.

**Check No. 17 on Reply Card for more Details**

## Specialty Capacitors

Development of a new, low-temperature Pyranol is announced by Transformer and Allied Product Divisions of General Electric Co., Schenectady 5, N. Y. These specialty capacitors show no loss in muf capacity for temperatures down to minus 32 C. This means that the same units can be used for high and low temperatures and for indoor and outdoor applications.

**Check No. 18 on Reply Card for more Details**

## Short Interval Timer

Type 30CR3 electronic timer, made by Photoswitch Inc., Cambridge 42, Mass., is designed to meet requirements for accurately controlled short interval timing. It has a timing range of from 3 to 120 cycles and fulfills specifications of NEMA class 1A nonsynchronous timers. It is recommended for spot welders and is applicable to manual, air or motor operated welding equipment.

**Check No. 19 on Reply Card for more Details**

## Improved Wrenches

Proto standard box wrenches, open end wrenches and combination box and open end wrenches have been redesigned by Plomb Tool Co., Los Angeles, Calif. Improvements include open end heads, flat surface shanks, lengths changed to provide proper leverage for each wrench.

**Check No. 20 on Reply Card for more Details**

## Abrasive Wheel Dresser

A boron carbide tipped abrasive wheel dresser, offered by Robert Marks Co., Providence, R. I., is designed for the free hand dressing of grinding wheels 10 inches in diameter or less and of M grade of hardness or softer. The insert is Norbide, made by Norton Co.

**Check No. 21 on Reply Card for more Details**

## Small Thread Inserts

Four new small-size stainless steel helical-wire thread inserts for strengthening tapped threads in aluminum, magnesium, plastic, iron, steel, brass, bronze and wooden components are available from the Heli-Coil Corp., Long Island City 1, N. Y. They include 8-36 and 6-40 sizes in the fine thread series, 5-40 and 4-40 sizes in the coarse thread series and are available in 1, 1½ and 2-diameter lengths.

**Check No. 22 on Reply Card for more Details**

## Cooling Lubricant

Emulsifier STH, a water soluble, metalworking coolant lubricant for use in cutting, grinding, drawing and stamping, is introduced by General Aniline & Film Corp., Easton, Pa. It is recommended for use in all types of metalworking machines that employ coolant recirculating systems properly sealed for handling water emulsions.

**Check No. 23 on Reply Card for more Details**

## Rust Preventive

Prevok No. 3, a general purpose rust preventive, is announced by Croda, Limited, Yorks, England. It thoroughly wets clean dry surfaces and forms a smooth unbroken film. It may be used on anodized aluminum; gasoline tank interiors; injectors; crankcases; sumps; interior engine assemblies; sheet, bar and rod steel.

**Check No. 24 on Reply Card for more Details**

## Removes, Installs Sleeves

Owatonna Tool Co., Owatonna, Minn., offers a special sleeve pulling and installing set as part of its power-twin hydraulic pulling system. It will pull and install cylinder liners on more than 200 different makes and models of trucks, tractors and power units. It is adjustable to center perfectly over the bore and provides clearance over cylinder head studs. It removes and installs sleeves from 3 to 6 inches without damage.

**Check No. 25 on Reply Card for more Details**

## Prepares Steel for Painting

Du-Bois Co., Cincinnati 3, O., announces Ion-Kote, a new cleaning and phosphatizing compound to prepare steel and other metals for painting. It is used in spray washers prior to painting and deposits a hard, dust-free, phosphate coating on metal which prevents rusting and increases paint adherence. It cleans rapidly and removes most cutting and forming compounds, rust preventives, smut and other dirts.

**Check No. 26 on Reply Card for more Details**

## Heater for Hot Spraying

Designed for hot spray technique in applying all types of protective coatings such as lacquers, enamels, varnishes, paints, priming and surface compounds, the tandem type paint heater is introduced by Dualheet Inc., Cleveland 2, O. Single or tandem installations may be mounted on the wall or equipped with casters for portability.

**Check No. 27 on Reply Card for more Details**

## Bronze Welding Rod

EutecRod 148FC, a new bronze welding rod featuring an extra-thin initial "tinning" action, has been developed by Eutectic Welding Alloys Corp., Flushing, N. Y. It is said to eliminate prewelding preparations and flow where directed without extensive chamfering. Each rod is covered with a new type of specially developed flux coating yielding full strength joints on old, corroded and dirty cast iron.

**Check No. 28 on Reply Card for more Details**

## Four-Pole Relay

Designated as class 8501 type PO4, a new four-pole relay is announced by Square D Co., Milwaukee 12, Wis. It is well suited for control assemblers, having all terminals exposed and occupying only a small space on the panel. It has four normally open and four normally closed contacts, allowing the circuit arrangement to be changed from normally open to normally closed by changing the incoming wires to different terminals.

**Check No. 29 on Reply Card for more Details**

## Concrete Hardener

Flintcrust liquid, a new concrete hardener, is offered by Flexrock Co., Philadelphia 4, Pa. It gives concrete floors a case hardened surface impervious to oil, grease and other disintegrating liquids. It counteracts and prevents sanding and eventual surface breakdown, and prevents drag of material handling equipment.

**Check No. 30 on Reply Card for more Details**

## Dry Chemical Fire Extinguisher

A 4-pound dry chemical fire extinguisher with a rubber hose is available from Ansul Chemical Co., Marinette, Wis. Operating range is 12 to 15 feet. Dry chemical is ejected through a self-closing nozzle that produces a fan-shaped stream pattern.

**Check No. 31 on Reply Card for more Details**

**FOR MORE INFORMATION**

on the new products and equipment in this section, fill in a card. It will receive prompt attention.

# Helpful Literature

### 73. Factory Call Signal

C. M. Lovsted & Co.—28-page illustrated form No. 683 covers Toots-E air and steam whistle signal systems for mills, factories and other installations. Data on Toots-E and Toots-E Jr. signals for routine finger-tip control or connection to fire alarm circuits, various attachments, generators, truck and automobile air horns and sirens are included.

### 74. Metal-Shaping Rolls

Ohio Steel Foundry Co.—30-page bulletin No. 451-R illustrates production of rolls used in shaping blooms, billets, rods and tubes, structural beams, strip and plate metal. Flow chart traces production path of rolls through the plant.

### 75. Liquid Meters

Rockwell Mfg. Co.—12-page illustrated bulletin No. OG 400 is guide for proper selection of meters for measuring over 200 liquids with varying corrosive characteristics. Industrial, chemical and refinery meters range in size from ½ to 3 in., measure in various units, have totalizer capacity of up to seven figures and are available in six types of registers.

### 76. Shapers

Klingelhofer Machine Tool Co.—6-page illustrated folder "Klopp Shaping Machines" describes line of imported heavy-duty single-spindle high-speed shapers which utilize friction roller drive.

### 77. Welding Accessories

Victor Equipment Co.—56-page illustrated catalog No. 24 contains full information on line of gas and electric welding machines; welding, brazing and hard-surfacing rods; flame cutting machines; welding and cutting accessories; and welder's protective equipment.

### 78. Metal Stamping Machines

Roberts Numbering Machine Co.—Leaflet "Metal Identification Marking" covers the identification, embossing, engraving and serializing of metal parts with numbering machines.

### 79. Automatic Oilers

Trico Fuse Mfg. Co.—Guidance for selection and application of visible automatic oilers is given in 4-page illustrated broadside "Series 4900". Described are constant level, gravity, wick, underfeed, multiple and large capacity types.

### 80. Pneumatic Standards

Miller Motor Co.—12-page booklet "J.I.C. Pneumatic Standards for Industrial Equipment" presents quality requirements adopted by Joint Industry Conference for pneumatic equipment users. Reproduced in booklet is a sample circuit, glossary of terms and two pages of standard symbols.

### 81. Voltage Regulators

Superior Electric Co.—12-page bulletin S351 details workings of Stabiline automatic voltage regulator for constant output voltage regardless of fluctuations in alternating current input line voltages and changes in output load. Type IE and EM Stabiline models are discussed. Rating chart aids in selecting unit for specific application.

### 82. Electric Motors

Wagner Electric Corp.—Condensed descriptions of single-phase, polyphase, squirrel-cage and direct current motors are contained in 4-page illustrated bulletin "Wagner Quality Motors".

### 83. Alloy Tool Steels

Bohler Bros. & Co.—75-page illustrated booklet "Bohler Alloy Tool Steels" presents basic information on high speed tool steels, alloy tool steels and special-purpose tool steels. Application data, recommended cutting angles, annealing and temper colors and processing information are included, along with list of products manufactured and conversion tables.

### 84. Straightening Machines

Medart Co. — 16-page illustrated bulletin No. RS50 presents general engineering data and specifications of rotary straightening, sizing and polishing machines for bars, tubes and pipe. Table contains data on two-roll, 2 & 2 universal, multicycle and three-roll straighteners.

### 85. Centrifugal Castings

Shenango-Penn Mold Co.—Two illustrated bulletins deal with production and properties of centrifugal castings. Bulletin 150 covers parts made of nonferrous metals such as bronze, Monel, nickel, aluminum and special alloys. Bulletin 151 discusses advantage of centrifugally cast Meehanite, Ni-Resist and special iron alloy parts.

### 86. Optical Inspection

Arthur S. La Pine & Co.—8-page illustrated brochure describes various models of optical and illuminating equipment for inspection jobs. Apparatus for inspection jobs ranging from simple naked-eye to high-power, close-tolerance examination are shown and their specifications given.

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| 2 | 22 | 42 | 62 | 82 |
| 3 | 23 | 43 | 63 | 83 |
| 4 | 24 | 44 | 64 | 84 |
| 5 | 25 | 45 | 65 | 85 |
| 6 | 26 | 46 | 66 | 86 |
| 7 | 27 | 47 | 67 | 87 |
| 8 | 28 | 48 | 68 | 88 |
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| 17 | 37 | 57 | 77 | 97 |
| 18 | 38 | 58 | 78 | 98 |
| 19 | 39 | 59 | 79 | 99 |
| 20 | 40 | 60 | 80 | 100 |

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NAME ____________ TITLE ____________

COMPANY ____________

PRODUCTS MANUFACTURED ____________

ADDRESS ____________

CITY and ZONE ____________ STATE ____________

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**87. Gear Hobber**

Hamilton Tool Co.—Typical work produced by and complete specification for No. 1 gear hobber are presented in 4-page illustrated bulletin H 1-49. This precision machine tool is designed for rapid generation of small spur, spiral and bevel gears; gear sectors; spline shafts; pinions and worm gears.

**88. Bearing Maintenance**

Anti-friction Bearing Distributors Association—20-page illustrated booklet "Installation—Maintenance—Removal of Anti-Friction Bearings" is guide to servicing, selection and application of ball, roller and needle bearings. "Bearing Maintenance Report" is regularly issued publication which deals with all phases of this subject. Included is file folder to simplify collection of bearing reference data.

**89. Rust-Prevention Wrapping**

Angier Corp.—12-page booklet gives full information on VPI Wrap, a noncorrosive paper for rust-preventive packaging of ferrous metal parts or pieces. Data tells what VPI Wrap is, how it works, its advantages and application. Samples are included.

**90. Roller Conveyors**

E. W. Buschman Co.—16-page illustrated catalog No. 60 shows wide variety of roller conveyor types, together with selection data and diagrams. Seven styles of ball bearing rollers are described as are roller mounting specifications, curves, multiple rows, spurs, converging and hinged sections, supports, stands and guard rails.

**91. Water Treatment**

Brooks Chemicals, Inc.—Illustrated bulletin No. 501 outlines company's service for safe and economical solution of industrial water treatment and conditioning problems through compounding treatments which correct all water used in plant operations. Treatments include boiler water, water line, cooling water, brine system, waste water, and zeolite softener.

**92. Small Parts Conveyor**

Arrow Products, Inc.—12-page illustrated folder No. 6812 covers uses and specifications of versatile model 612 Pressman conveyor for handling small parts, stampings and scrap. Powered by either ¼-hp or ⅓-hp standard frame motors, conveyor has belt speed of 85 ft per minute.

**93. Fastener Effect On Joints**

Russell, Burdsall & Ward Bolt & Nut Co.—28-page illustrated Northwestern University research report No. C101 covers "Effect of Various Fasteners on Fatigue Strength of a Structural Joint".

**94. Threading Machine**

Lees-Bradner Co.—Illustrated circular No. 85 "Here's the Point" outlines how Sentinel Cri-Dan semiautomatic high speed threading machine distributed by company is providing versatility, speed and economy in generating threads. Number of cuts made by single point tools is predetermined and set by dial.

**95. Nonferrous Metal Finishes**

Allied Research Products, Inc.—Complete line of Iridite finishes for nonferrous metals are described in 4-page illustrated bulletin. Process affords corrosion resistance, paint adherence and eye appeal to zinc, cadmium, aluminum and cuprous alloy surfaces.

**96. Torquemeter**

Baldwin-Lima-Hamilton Corp.—8-page illustrated bulletin 328 deals with Baldwin SR-4 torquemeters which utilize special SR-4 resistance wire strain gages. Unit consists of torque pickup and indicating or recording instrument. Instruments are available with ranges from 100 to 30,000 in. lb.

**97. Fan-Cooled Motors**

Allis-Chalmers Mfg. Co.—6-page bulletin describes types of construction and ratings of totally-enclosed, fan-cooled motors with tube-type, air-to-air heat exchangers. Chart shows ratings available in squirrel-cage, wound-rotor and synchronous types for both horizontal and vertical installation.

**98. Vibration Tester**

All American Tool & Mfg. Co.—6-page illustrated folder "How Much Vibration Will Your Products Stand?" describes various models of vibration fatigue testing machines which have table load capacities up to 100 lb at 10 g. Manual and automatic acceleration of vibration frequency can be applied to any product under test.

**99. Flexible Hoses & Fittings**

Aeroquip Corp.—42-page loose-leaf catalog contains full specifications of line of flexible hoses and self-sealing couplings. Various applications and uses are pictured, and assembly instructions for single and double wire braid, as well as high pressure, hose and fittings are presented.

**100. Elevated Tank Controls**

Automatic Control Co.—Autocon Multi-Pump Tanktrols for maintaining proper liquid levels in elevated tank systems are featured in 4-page illustrated bulletin 1110. How balanced pump operation and automatic alternation of pumps assure efficient low-cost operation is explained.

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| 14 | 34 | 54 | 74 | 94 |
| 15 | 35 | 55 | 75 | 95 |
| 16 | 36 | 56 | 76 | 96 |
| 17 | 37 | 57 | 77 | 97 |
| 18 | 38 | 58 | 78 | 98 |
| 19 | 39 | 59 | 79 | 99 |
| 20 | 40 | 60 | 80 | 100 |

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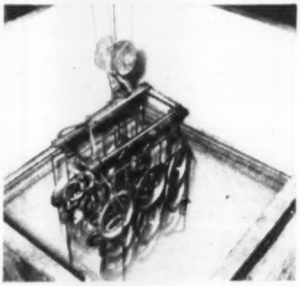
# Vapor Degreasing GIVES YOU

## ONE-STEP CLEANING . . . THAT'S FAST AND TROUBLE-FREE

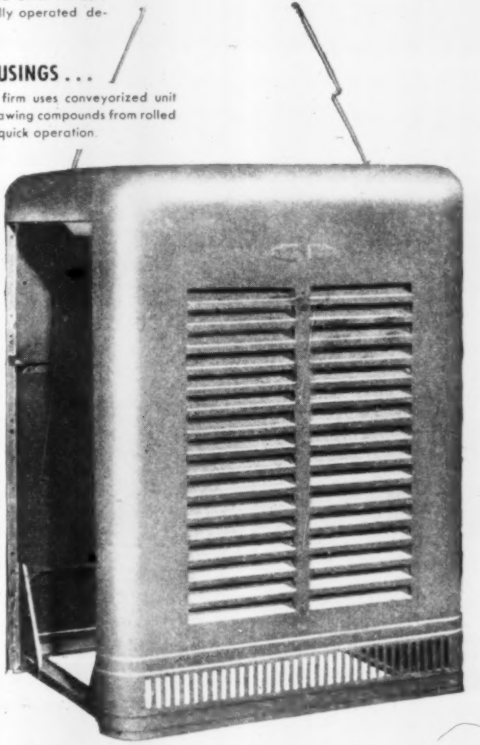


**FOR PRECISION PARTS . . .**

Aircraft engine manufacturer cleans up to 7,000 pounds of gears, brackets and other intricate parts per hour in this manually operated degreaser.

**OR HEAVY HOUSINGS . . .**

Heating-equipment firm uses conveyorized unit to remove oil and drawing compounds from rolled steel casings in one quick operation.



**Whether your cleaning problem** concerns tiny washers or giant housings, consider vapor degreasing with Du Pont Trichlorethylene.

Thousands of manufacturers are now using this fast, safe, efficient method of metal cleaning. It's easy to install, easy to operate, easy to maintain . . . especially applicable for plants that are expanding production or doing metal cleaning for the first time.

You, too, can keep cleaning costs down and production up with vapor degreasing.

**Du Pont Degreasing Solvents** have been widely used for many years and are available under various trade marks, such as "Triclene" D.

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These solvents are stable . . . stand up against contaminating and destructive materials . . . are the best yet developed by Du Pont for metal degreasing.

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Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used, and Du Pont solvents available. We are interested in cleaning __________ products.

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*Firm*______________________________

*Street and No.*__________________________

*City*____________________ *State*__________

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STEEL July 23, 1951

# The Market Outlook

MANUFACTURERS of hard civilian goods—automobiles, refrigerators, washing machines, electric toasters—can count on getting 15 per cent of the total steel supply during the closing months of this year. This is estimated to be sufficient to permit them to maintain manufacture of their products within the limitation orders set up by the National Production Authority. NPA is making plans to include the durable civilian goods manufacturers under the Controlled Materials Plan starting in the fourth quarter and will allocate an average of 15 per cent of steel output to their products. The percentages will vary according to product, and these consumers will receive more than 15 per cent of the output of such products as sheets, commonly used in civilian hard goods. Similar action will be taken to provide civilian manufacturers with copper and aluminum and the basic control orders governing the controlled materials now are being revised to insure they get the materials.

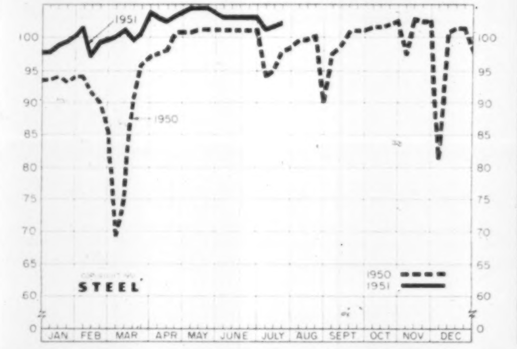
**DEMAND**—Steel producers, however, report mill books for most products are filled to the limit of the set asides ordered by NPA through September, and in some cases, through October and November as well. Eastern bar producers have received more rated tonnage for September then they can possibly handle and some of this tonnage will have to be carried over into the fourth quarter. Structural shape mills generally are booked solidly from September through November. Some sheet mills have free tonnage available for September, although many are filled up through November. The mill picture raises a question as to how the nonrated steel consumers are going to obtain the 15 per cent of steel output which NPA wants them to have in September. Many conferences on the subject are going on in Washington and it is suggested that orders on mill books may be screened to eliminate possible overordering.

**SCRAP**—Fears are growing in the steel industry that production may suffer this winter for lack of scrap. Inventories at leading steel mills now range from 4 or 5 days' supply up to three weeks'. Normal inventory at this season is about 60 days. Although scrap is flowing in fair volume, consumption rates are so high that practically all mills find it is impossible to build up stocks. Traditionally, mills accumulate more scrap than they use during summer months to carry them over the winter when weather conditions cut down the collection and shipment of iron and steel scrap. The pinch arises from sharply increased demands for scrap to feed the expanded steel capacity. Requirements for market scrap this year will be 36 million tons or nearly 25 per cent more than was used in 1950, which itself was a record year. Getting underway in many communities is a national scrap drive aimed at bringing out 8 million tons of dormant scrap in the form of obsolete machinery and equipment at factories, farms, shipyards, army, navy and other government installations, and battle fields.

**PRODUCTION**—Regardless of possible raw materials shortages this winter, steel production continues to roar along in excess of rated capacity. Output of ingots and steel for castings has exceeded 2 million tons a week since early March. Last week, the national steelworks operating rate edged up a half point to 102 per cent of capacity, equal to 2,040,000 tons.

**PRICES**—With the exception of adjustments in prices on nickel-bearing steels to compensate for the June 1 increase in nickel costs, iron and steel prices are steady at ceiling levels. STEEL's weighted index on finished steel holds at 171.92 and compares with 156.69 for the like week a year ago while the arithmetical price composite is $106.32 against $94.36. Pig iron composites for last week compared with those for the like 1950 week are: No. 2 foundry, $52.54 and $46.47; basic, $52.16 and $45.97; malleable, $53.27 and $47.27. Steelmaking scrap composite is $44 compared with $37.25 a year ago.

NATIONAL STEELWORKS OPERATIONS



## DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

| | Week Ended July 21 | Change | Same Week 1950 | Same Week 1949 |
|---|---|---|---|---|
| Pittsburgh | 98.5 | 1.5* | 99 | 74.5 |
| Chicago | 107 | .05 | 100.5 | 87 |
| Mid-Atlantic | 101 | 0 | 97 | 80 |
| Youngstown | 103 | 2 | 107 | 70 |
| Wheeling | 92 | 5 | 101.5 | 85.5 |
| Cleveland | 98.5 | 2* | 97 | 88.5 |
| Buffalo | 104 | 0 | 104 | 93 |
| Birmingham | 100 | 0 | 100 | 100 |
| New England | 75 | 19 | 90 | 10 |
| Cincinnati | 103 | 1 | 102 | 91 |
| St. Louis | 97 | 6.5 | 83.5 | 87 |
| Detroit | 101.5 | 1.5 | 105 | 102 |
| Western | 102 | 1 | 95 | 77 |
| Estimated national rate | 102 | 0.5 | 98 | 77 |

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 29 Production-Engineering News—p. 65

# Composite Market Averages

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| **FINISHED STEEL INDEX, Weighted:** | | | | | |
| Index (1935-39 av.=100).. | 171.92 | 171.92 | 171.92 | 156.69 | 112.04 |
| Index in cents per lb. .... | 4.657 | 4.657 | 4.657 | 4.245 | 3.035 |
| **ARITHMETICAL PRICE COMPOSITES:** | | | | | |
| Finished Steel, NT ....... | $106.32 | $106.32 | $106.32 | $94.36 | $64.45 |
| No. 2 Fdry. Pig Iron, GT.. | 52.54 | 52.54 | 52.54 | 46.47 | 28.17 |
| Basic Pig Iron, GT ....... | 52.16 | 52.16 | 52.16 | 45.97 | 27.50 |
| Malleable Pig Iron, GT ... | 53.27 | 53.27 | 53.27 | 47.27 | 28.79 |
| Steelmaking Scrap, GT ... | 44.00 | 44.00 | 44.00 | 37.25 | 19.17 |

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

# Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

## FINISHED MATERIALS

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bars, H.R., Pittsburgh .... | 3.70 | 3.70 | 3.70 | 3.45 | 2.50 |
| Bars, H.R., Chicago ...... | 3.70 | 3.70 | 3.70 | 3.45 | 2.50 |
| Bars, H.R., del. Philadelphia | 4.20 | 4.20 | 4.20 | 3.93 | 2.86 |
| Bars, C.F., Pittsburgh .... | 4.55 | 4.55 | 4.55 | 4.10-15 | 3.10 |
| Shapes, Std., Pittsburgh .. | 3.65 | 3.65 | 3.65 | 3.40 | 2.35 |
| Shapes, Std., Chicago .... | 3.65 | 3.65 | 3.65 | 3.40 | 2.35 |
| Shapes, del. Philadelphia .. | 3.91 | 3.91 | 3.91 | 3.46 | 2.48 |
| Plates, Pittsburgh ........ | 3.70 | 3.70 | 3.70 | 3.50 | 2.50 |
| Plates, Chicago .......... | 3.70 | 3.70 | 3.70 | 3.50 | 2.50 |
| Plates, Coatesville, Pa. ... | 4.15 | 4.15 | 4.15 | 3.60 | 2.50 |
| Plates, Sparrows Point, Md. | 3.70 | 3.70 | 3.70 | 3.50 | 2.50 |
| Plates, Claymont, Del. .... | 4.15 | 4.15 | 4.15 | 3.60 | 2.50 |
| Sheets, H.R., Pittsburgh .. | 3.60-75 | 3.60-75 | 3.60-75 | 3.35 | 2.425 |
| Sheets, H.R., Chicago ..... | 3.60 | 3.60 | 3.60 | 3.35 | 2.425 |
| Sheets, C.R., Pittsburgh .. | 4.35 | 4.35 | 4.35 | 4.10 | 3.275 |
| Sheets, C.R., Chicago ..... | 4.35 | 4.35 | 4.35 | 4.10 | 3.275 |
| Sheets, C.R., Detroit ..... | 4.55 | 4.55 | 4.55 | 4.30 | 3.375 |
| Sheets, Galv., Pittsburgh.. | 4.80 | 4.80 | 4.80 | 4.40 | 4.05 |
| Strip, H.R., Pittsburgh ... | 3.75-4.00 | 3.75-4.00 | 3.75-4.00 | 3.25-50 | 2.35 |
| Strip, H.R., Chicago ..... | 3.50 | 3.50 | 3.50 | 3.25 | 2.35 |
| Strip, C.R., Pittsburgh ... | 4.65-5.35 | 4.65-5.35 | 4.65-5.35 | 4.15-50 | 3.05 |
| Strip, C.R., Chicago ..... | 4.90 | 4.90 | 4.90 | 4.30 | 3.15 |
| Strip, C.R., Detroit ...... | 4.35-5.60 | 4.35-5.60 | 4.35-5.60 | 4.35-95 | 3.15 |
| Wire, Basic, Pittsburgh ... | 4.85-5.10 | 4.85-5.10 | 4.85-5.10 | 4.50 | 3.05 |
| Nails, Wire, Pittsburgh ... | 5.90-6.20 | 5.90-6.20 | 5.90-6.20 | 5.30 | 3.75 |
| Tin plate, box, Pittsburgh. | $8.70 | $8.70 | $8.70 | $7.50 | $5.25 |

## SEMIFINISHED

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Billets, forging, Pitts (NT) | $66.00 | $66.00 | $66.00 | $63.00 | $47.00 |
| Wire rods, [illegible]", Pitts. .. | 4.10-30 | 4.10-30 | 4.10-30 | 3.85 | 2.30 |

## PIG IRON, Gross Ton

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bessemer, Pitts. ......... | $53.00 | $53.00 | $53.00 | $47.00 | $29.00 |
| Basic Valley ............ | 52.00 | 52.00 | 52.00 | 46.00 | 28.00 |
| Basic, del. Phila. ........ | 56.49 | 56.49 | 56.49 | 49.44 | 29.93 |
| No. 2 Fdry. Pitts. ........ | 52.50 | 52.50 | 52.50 | 46.50 | 28.50 |
| No. 2 Fdry, Chicago ...... | 52.50 | 52.50 | 52.50 | 46.50 | 28.50 |
| No. 2 Fdry, Valley ...... | 52.50 | 52.50 | 52.50 | 46.50 | 28.50 |
| No. 2 Fdry, Del. Phila. ... | 56.99 | 56.99 | 56.99 | 49.94 | 30.43 |
| No. 2 Fdry, Birm. ....... | 48.88 | 48.88 | 48.88 | 42.38 | 24.88 |
| No. 2 Fdry (Birm.)del. Cin. | 55.33 | 55.33 | 55.33 | 49.08 | 28.94 |
| Malleable Valley ......... | 52.50 | 52.50 | 52.50 | 46.50 | 28.50 |
| Malleable, Chicago ...... | 52.50 | 52.50 | 52.50 | 46.50 | 28.50 |
| Charcoal, Lyles, Tenn. .... | 66.00 | 66.00 | 66.00 | 60.00 | 33.00 |
| Ferromanganese, Etna, Pa. | 188.00 | 188.00 | 188.00 | 175.00 | 140.00* |

* Delivered Pittsburgh.

## SCRAP, Gross Ton (including broker's commission)

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| No. 1 Heavy Melt, Pitts. .. | $45.00 | $45.00 | $45.00 | $41.00 | $20.00 |
| No. 1 Heavy Melt, E. Pa. | 43.50 | 43.50 | 43.50 | 33.00 | 18.75 |
| No. 1 Heavy Melt, Chicago | 43.50 | 43.50 | 43.50 | 37.75 | 18.75 |
| No. 1 Heavy Melt, Valley . | 45.00 | 45.00 | 45.00 | 40.75 | 20.00 |
| No. 1 Heavy Melt, Cleve. | 44.00 | 44.00 | 44.00 | 38.50 | 19.50 |
| No. 1 Heavy Melt, Buffalo | 44.00 | 44.00 | 44.00 | 36.75 | 19.25 |
| Rails, Rerolling, Chicago .. | 52.50 | 52.50 | 52.50 | 48.50 | 22.25 |
| No. 1 Cast, Chicago ...... | 49.00* | 49.00* | 49.00* | 44.50 | 20.00 |

* F.o.b. shipping point.

## COKE, Net Ton

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Beehive, Furn. Connlsvl. .. | $14.75 | $14.75 | $14.75 | $14.25 | $8.75 |
| Beehive, Fdry., Connlsvl. .. | 17.50 | 17.50 | 17.50 | 15.50 | 9.50 |
| Oven Fdry., Chicago ...... | 21.00 | 21.00 | 21.00 | 21.00 | 14.35 |

## NONFERROUS METALS

| | July 19 1951 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Copper, del. Conn. ........ | 24.50 | 24.50 | 24.50 | 22.50 | 14.375 |
| Zinc, E. St. Louis ........ | 17.50 | 17.50 | 17.50 | 15.00 | 9.50 |
| Lead, St. Louis .......... | 16.80 | 16.80 | 16.80 | 11.80 | 9.35 |
| Tin, New York ........... | 106.00 | 106.00 | 106.00 | 91.00 | 52.00 |
| Aluminum, del. .......... | 19.00 | 19.00 | 19.00 | 17.50-18.50 | 15.00 |
| Antimony, Laredo, Tex. .. | 42.00 | 42.00 | 42.00 | 24.50 | 14.50 |
| Nickel, refinery, duty paid | 56.50 | 56.50 | 56.50 | 48.00 | 35.00 |

# PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on second following page.

## PIG IRON, Gross Ton

| | Basic | No. 2 Foundry | Malleable | Bessemer |
|---|---|---|---|---|
| Bethlehem Pa. B2 ................ | $54.00 | $54.50 | $55.00 | $56.50 |
| Brooklyn,N.Y.,del. .............. | .... | 58.69 | 59.46 | .... |
| Newark,del. ..................... | 56.74 | 57.24 | 57.74 | 58.24 |
| Philadelphia,del. ................ | 56.49 | 56.99 | 57.49 | 57.99 |
| *Birmingham District* | | | | |
| AlabamaCity,Ala. R2 | 48.38 | 48.88 | .... | .... |
| Birmingham R2 | 48.38 | 48.88 | .... | .... |
| Birmingham S9 | 48.38 | 48.88 | .... | .... |
| Woodward,Ala. W15 | 48.38 | 48.88 | .... | .... |
| Cincinnati,del. | .... | 55.33 | .... | .... |
| *Buffalo District* | | | | |
| Buffalo R2 | 52.00 | 52.50 | 53.00 | .... |
| Buffalo H1 | 52.00 | 52.50 | 53.00 | .... |
| Tonawanda,N.Y. W12 | 52.00 | 52.50 | 53.00 | .... |
| No.Tonawanda,N.Y. T9 | .... | 52.50 | 53.00 | .... |
| Boston, del. | 61.63 | 62.13 | 62.63 | .... |
| Rochester,N.Y., del. | 54.74 | 55.24 | 55.74 | .... |
| Syracuse,N.Y.,del. | 55.72 | 56.22 | 56.72 | .... |
| *Chicago District* | | | | |
| Chicago I-3 ...................... | 52.00 | 52.50 | 52.50 | 53.00 |
| Gary,Ind. U5 ..................... | 52.00 | .... | 52.50 | .... |
| IndianaHarbor,Ind. I-2 ........... | 52.00 | .... | 52.50 | .... |
| So.Chicago,Ill. W14 .............. | 52.00 | 52.50 | 52.50 | .... |
| So.Chicago,Ill. Y1 ............... | 52.00 | 52.50 | 52.50 | .... |
| So.Chicago,Ill. U5 ............... | 52.00 | .... | 52.50 | 53.00 |
| Milwaukee, del. .................. | 53.97 | 54.47 | 54.47 | 54.97 |
| Muskegon,Mich.,del. .............. | .... | 58.20 | 58.20 | .... |
| *Cleveland District* | | | | |
| Cleveland A7 ..................... | 52.00 | 52.50 | 52.50 | 53.00 |
| Cleveland R2 ..................... | 52.00 | 52.50 | 52.50 | .... |
| Akron, del. from Cleve. ........ | 54.49 | 54.99 | 54.99 | 55.49 |
| Lorain,O. N3 ..................... | 52.00 | .... | .... | 53.00 |
| Duluth I-3 ....................... | .... | .... | 52.50 | .... |
| Erie,Pa. I-3 ..................... | 52.00 | 52.50 | 52.50 | 53.00 |
| Everett,Mass. E1 ................. | .... | 55.25 | 55.75 | .... |
| Fontana,Calif. K1 ................ | 58.00 | 58.50 | .... | .... |
| Geneva,Utah G1 ................... | 52.00 | 52.50 | .... | .... |
| Seattle,Tacoma,Wash.,del. ...... | .... | 60.35 | .... | .... |
| Portland,Oreg.,del. ............. | .... | 60.35 | .... | .... |
| LosAngeles,SanFrancisco,del. .... | 59.85 | 60.35 | .... | .... |
| GraniteCity,Ill. G4 .............. | 53.90 | 54.40 | 54.90 | .... |
| St.Louis,del. (inc. tax) ........ | 54.66 | 55.16 | 55.66 | .... |
| Ironton,Utah C11 ................. | 52.00 | 52.50 | .... | .... |
| LoneStar,Tex. L6 ................. | 48.00 | *48.50 | 48.50 | .... |
| Minnequa,Colo. C10 ............... | 54.00 | 55.00 | 55.00 | .... |
| *Pittsburgh District* | | | | |
| NevilleIsland,Pa. P6 ............. | .... | 52.50 | 52.50 | 53.00 |
| Pitts., N.&S. sides, Ambridge, Aliquippa,del. ... | .... | 53.74 | 53.74 | 54.24 |
| McKeesRocks, del. ................ | .... | 53.49 | 53.49 | 53.99 |
| Lawrenceville, Homestead, McKeesport,Monaca,del. ...... | .... | 54.00 | 54.00 | 54.50 |
| Verona,del. ...................... | .... | 54.48 | 54.48 | 54.98 |
| Brackenridge,del. ................ | .... | 54.72 | 54.72 | 55.22 |
| Bessemer,Pa. U5 .................. | 52.00 | .... | 52.50 | 53.00 |
| Clairton,Rankin,So.Duquesne,Pa. U5 | 52.00 | .... | .... | .... |
| McKeesport,Pa. N3 ................ | 52.00 | .... | .... | 53.00 |
| Monessen,Pa. P7 .................. | 54.00 | .... | .... | .... |
| Sharpsville,Pa. S6 ............... | .... | .... | 52.50 | 53.00 |
| Steelton,Pa. B2 .................. | 54.00 | 54.50 | 56.00 | 55.50 |
| Swedeland,Pa. A3 ................. | 56.00 | 56.50 | 57.00 | 57.50 |
| Toledo,O. I-3 .................... | 52.00 | 52.50 | 52.50 | 53.00 |
| Cincinnati,del. .................. | 57.21 | 57.71 | .... | .... |
| Troy,N.Y. R2 ..................... | 54.00 | 54.50 | 55.00 | 55.50 |
| *Youngstown District* | | | | |
| Hubbard,O. Y1 .................... | 52.00 | 52.50 | 52.50 | .... |
| Youngstown Y1 .................... | 52.00 | 52.50 | 52.50 | .... |
| Youngstown U5 .................... | 52.00 | .... | .... | 53.00 |
| Mansfield,O.,del. ................ | 56.43 | 56.93 | 56.93 | 57.43 |

* Low phos, southern grade.

### PIG IRON DIFFERENTIALS

*Silicon:* Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

*Phosphorus:* Deduct 38 cents per ton for P content of 0.70% and over.

*Manganese:* Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

*Nickel:* Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

## BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

| | |
|---|---|
| Jackson,O. G2, J1 ............................ | $62.50 |
| Buffalo H1 ................................... | 63.75 |

## ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

| | |
|---|---|
| NiagaraFalls,N.Y. P15 ........................ | $88.00 |
| Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2.......... | 92.50 |
| Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2 | 95.50 |
| Wenatchee, Wash., O.H. & Fdry., frt. allowed K2 .......... | 92.50 |

## CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 x 6)

| | |
|---|---|
| Lyles,Tenn. T3 ............................... | $66.00 |

## LOW PHOSPHORUS PIG IRON, Gross Ton

| | |
|---|---|
| Cleveland, intermediate, A7 .................. | $57.00 |
| Steelton,Pa. B2 .............................. | 60.00 |
| Philadelphia delivered ....................... | 63.12 |
| Troy,N.Y. R2 ................................. | 60.00 |

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# Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, July 19, 1951 cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

**INGOTS, Carbon, Forging (NT)**
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5*........52.00

**INGOTS, Alloy (NT)**
Detroit R7 ...........$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ......62.00
Midland,Pa. C18 ......54.00
Munhall,Pa. U5 .......54.00

**BILLETS, BLOOMS & SLABS**
**Carbon, Rerolling (NT)**
Bessemer,Pa. U5 .....$56.00
Clairton,Pa. U5 .......56.00
Ensley,Ala. T2 ........56.00
Fairfield,Ala. T2 ......56.00
Fontana,Calif. K1 .....75.00
Gary,Ind. U5 ..........56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y. B2..56.00
Munhall,Pa. U5 .......56.00
So.Chicago,Ill. U5 .....56.00
So.Duquesne,Pa. U5 ...56.00

**Carbon, Forging (NT)**
Bessemer,Pa. U5 .....$66.00
Buffalo R2 ............66.00
Canton,O. R2 ..........66.00
Clairton,Pa. U5 .......66.00
Cleveland R2 ..........66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ............69.00
Ensley,Ala. T2 ........66.00
Fairfield,Ala. T2 ......66.00
Fontana,Calif. K1 .....85.00
Gary,Ind. U5 ..........66.00
Geneva,Utah G1 ......66.00
Houston,Tex. S5 ......74.00
Johnstown,Pa. B2 .....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 ........85.00
Munhall,Pa. U5 .......66.00
Seattle B3 ............85.00
So.Chicago R2,U5,W14 66.00
So.Duquesne,Pa. U5 ...66.00
So.SanFrancisco B3 ...85.00

**Alloy, Forging (NT)**
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ............70.00
Canton,O. R2 ..........70.00
Canton,O. (29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ............73.00
Fontana,Calif. K1 .....89.00
Gary,Ind. U5 ..........70.00
Houston,Tex. S5 ......78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 .....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ........90.00
Massillon,O. R2 .......70.00
Midland,Pa. C18 .......70.00
Munhall,Pa. U5 .......70.00
So.Chicago R2,U5,W14 .70.00
So.Duquesne,Pa. U5 ...70.00
Struthers, O. Y1 ......70.00
Warren,O. C17 ........70.00

**ROUNDS, SEAMLESS TUBE (NT)**
Canton,O. R2 .......$82.00
Cleveland R2 ..........82.00
Fontana,Calif. K1 ...103.00
Gary,Ind. U5 ..........82.00
Massillon,O. R2 .......82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ...82.00

**SHEET BARS (NT)**
Fontana,Calif. K1 ...$89.00

**SKELP**
Aliquippa,Pa. J5 ......3.45
Munhall,Pa. U5 .......3.35
Warren,O. R2 ..........3.35
Youngstown R2, U5 ....3.35

**WIRE RODS**
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 ...........4.10
Cleveland A7 ..........4.10
Donora,Pa. A7 .........4.10
Fairfield,Ala. T2 .......4.10
Fontana,Calif. K1 .....4.90
Houston,Tex. S5 .......4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 ..........4.10
LosAngeles B3 .........4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .......4.30
No.Tonawanda,N.Y.B11 4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 .....4.30
Roebling, N. J. R5 .....4.20
So.Chicago,Ill. R2 ......4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 .....4.10
Struthers,O. Y1 .........4.10
Torrance,Calif. C11 ....4.90
Worcester A7 ..........4.40

**SHEET STEEL PILING**
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ...4.45
Munhall,Pa. U5 .......4.45
So.Chicago,Ill. U5 .....4.45

**STRUCTURALS**
**Carbon Steel Stand. Shapes**
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .......3.65
Bessemer,Ala. T2 ......3.65
Bethlehem,Pa. B2 ......3.70
Clairton,Pa. U5 ........3.65
Fairfield,Ala. T2 .......3.65
Fontana,Calif. K1 ......4.25
Gary,Ind. U5 ..........3.65
Geneva,Utah G1 .......3.65
Houston,Tex. S5 .......4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .........4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .......3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....4.95
Portland,Oreg. O4 ......4.50
Seattle B3 ..............4.30
So.Chicago,Ill. U5, W14 3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

**Alloy Stand. Shapes**
Clairton,Pa. U5 ........4.35
Fontana,Calif. K1 ......5.55
Munhall,Pa. U5 .......4.35
So.Chicago, Ill. U5......4.35

**H.S., L.A. Stand. Shapes**
Aliquippa,Pa. J5 .......5.50
Bessemer,Ala. T2 ......5.50
Bethlehem,Pa.(14) B2..5.50
Clairton,Pa. U5 ........5.50
Fairfield,Ala. T2 .......5.50
Fontana,Calif. K1 ......6.10
Gary,Ind. U5 ..........5.50
Geneva,Utah G1 .......5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 ......5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .........6.05
Munhall,Pa. U5 .......5.50
Seattle B3 ..............6.10
So.Chicago,Ill. U5 ......5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .........6.00

**Wide Flange**
Bethlehem,Pa. B2 ......3.70
Clairton,Pa. U5 ........3.65
Fontana,Calif. K1 ......4.65
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 .......3.65
So.Chicago,Ill. U5 ......3.65

**H.S., L.A. Wide Flange**
Bethlehem,Pa. B2 ......5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .......5.45
So.Chicago,Ill. U5 ......5.45

**BEARING PILES**
Munhall,Pa. U5 .......3.65
So.Chicago,Ill. U5 ......3.65

**PLATES, High-Strength Low-Alloy**
Aliquippa,Pa. J5 .......5.65
Bessemer,Ala., T2 ......5.65
Clairton,Pa. U5 ........5.65
Cleveland J5, R2 .......5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 .......5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ..........5.65
Geneva,Utah G1 .......5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ......5.65
Munhall,Pa. U5 .......5.65
Pittsburgh J5 ..........5.65
Seattle B3 ..............6.55
Sharon,Pa. S3 ..........5.70
So.Chicago,Ill. U5 ......5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ..........5.65
Youngstown Y1 ........6.15

**PLATES, Open-Hearth Alloy**
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 ......5.70
Gary,Ind. U5 ..........4.75
Johnstown,Pa. B2 ......4.75
Munhall,Pa. U5 .......4.75
Sharon,Pa. S3 ..........5.20
So.Chicago,Ill. U5 ......4.75
SparrowsPoint,Md. B2 ..4.75

**FLOOR PLATES**
Cleveland J5 ...........4.75
Conshohocken,Pa. A3 ..4.75
Harrisburg,Pa. C5 .....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .......4.75
So.Chicago,Ill. U5 ......4.75

**PLATES, Ingot Iron**
Ashland,c.l.(15) A10 ...3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 ......4.30
Warren,O.c.l. R2 ......4.30

**PLATES, Carbon Steel**
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .......3.70
Ashland,Ky.(15) A10 ..3.70
Bessemer,Ala. T2 ......3.70
Clairton,Pa. U5 ........3.70
Claymont,Del. C22 .....4.15
Cleveland J5, R2 .......3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3...4.15
Fairfield, Ala. T2 ......3.70
Fontana,Calif.(30) K1..4.30
Gary,Ind. U5 ..........3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah G1 .......3.70
Harrisburg,Pa. C5 .....4.95
Houston,Tex. S5 .......4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ......3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .......3.70
Pittsburgh J5 ..........3.70
Seattle B3 ..............4.60
Sharon,Pa. S3 ..........3.95
So.Chicago,Ill. U5, W14 3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ..........3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 3.70

**PLATES, Carbon A. R.**
Fontana,Calif. K1 ......5.45
Geneva,Utah G1 .......4.85

**PLATES, Wrought Iron**
Economy,Pa. B14 .......8.60

**BARS, Hot-Rolled Carbon**
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .......3.70
Alton,Ill.(1) L1 ........3.95
Atlanta,Ga. A11 ........4.25
Bessemer,Ala. T2 ......3.70
Buffalo R2 ..............3.70
Canton,O. R2 ..........3.70
Clairton,Pa. U5 ........3.70
Cleveland R2 ..........3.70
Detroit R7 ..............3.85
Emeryville,Calif. J7 ...4.45
Fairfield,Ala. T2 .......3.70
Fontana,Calif. K1 ......4.40
Gary,Ind. U5 ..........3.70
Houston,Tex. S5 .......4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ......3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .........4.40
Milton,Pa. B6 ..........4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ..........5.05
N.Tonawanda,N.Y. B11 3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ..........3.70
Portland,Oreg. O4 ......4.65
Seattle B3, N14 .........4.45
So.Chicago R2, U5, W14 3.70
So.Duquesne,Pa. U5 ...3.70
So.SanFran.,Cal. B3 ...4.45
Struthers,O. Y1 .........3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

**BAR SIZE ANGLES; S. SHAPES**
Aliquippa,Pa. J5 .......3.70
Atlanta A11 ............4.25
Johnstown,Pa. B2 ......3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 ..........5.05
Portland,Oreg. O4 ......4.65
SanFrancisco S7 .......4.85

**BAR SIZE ANGLES; H.R. CARBON**
Bethlehem,Pa. B2 ......3.90

**BARS, Hot-Rolled Alloy**
Bethlehem,Pa. B2 ......4.30
Buffalo R2 ..............4.30
Canton,O. R2 ..........4.30
Canton,O.(29) T7 ......3.95
Clairton,Pa. U5 ........4.30
Detroit R7 ..............4.45
Ecorse,Mich. G5 .......4.65
Fontana,Calif. K1 ......5.35
Gary,Ind. U5 ..........4.30
Houston,Tex. S5 .......4.70
Ind.Harbor,Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ......4.30
KansasCity, Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .........5.35
Massillon,O. R2 .......4.30
Midland,Pa. C18 .......4.30
So.Chicago R2,U5,W14..4.30
S.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .........4.30
Warren,O. C17 ........4.30
Youngstown U5 ........4.30

**BAR SHAPES, Hot-Rolled Alloy**
Clairton,Pa. U5 ........4.55
Gary,Ind. U5 ..........4.55
Youngstown U5 ........4.55

**BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy**
Aliquippa,Pa. J5 .......5.55
Bessemer,Ala. T2 ......5.55
Bethlehem,Pa. B2 ......5.55
Clairton,Pa. U5 ........5.55
Cleveland R2 ..........5.55
Fairfield,Ala. T2 .......5.55
Fontana,Calif. K1 ......6.60
Gary,Ind. U5 ..........5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 ......5.55
Lackawanna, N. Y. B2..5.55
LosAngeles B3 .........6.25
Pittsburgh J5 ..........5.55
Seattle B3 ..............6.30
So.Duquesne,Pa. U5 ...5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .........6.05
Youngstown U5 ........5.55

**BARS, Cold-Finished Carbon**
Ambridge,Pa. W18 .....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo B5 ..............4.60
Camden,N.J. P13 ......5.00
Carnegie,Pa. C12 ......4.55
Chicago W18 ..........4.55
Cleveland A7, C20 .....4.55
Detroit P17 ............4.70
Donora,Pa. A7 .........4.55
Elyria,O. W8 ...........4.55
FranklinPark,Ill. N5 ...4.55
Gary,Ind. R2 ..........4.55
GreenBay,Wis. F7 ......4.55
Hammond,Ind. L2, M13 4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 ..........4.55
LosAngeles R2 .........6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8....4.55
Monaca,Pa. S17 ........4.55
Newark,N.J. W18 ......5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ..........4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .......4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3...5.00
Struthers,O. Y1 .........4.55
Waukegan,Ill. A7 ......4.55
Youngstown F3, Y1 ....4.55

**BARS, Cold-Finished Alloy**
Ambridge, Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
Bethlehem,Pa. B2 ......5.40
Buffalo B5 ..............5.40
Camden,N.J. P13 ......5.80
Canton,O. R2 ..........5.40
Canton,O.(29) T7 ......4.90
Carnegie,Pa. C12 ......5.40
Chicago W18 ..........5.40
Cleveland A7 ..........5.45
Cleveland C20 .........5.40
Detroit P17 ............5.55
Donora,Pa. A7 .........5.45
Elyria,O. W8 ...........5.40
Gary,Ind. R2...........5.40
Hammond,Ind. L2, M13 5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 ..........5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8.....5.40
Midland,Pa. C18 .......5.40
Monaca,Pa. S17 ........5.40
Newark,N.J. W18 ......5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 .........5.40
Warren,O. C17 ........5.40
Waukegan,Ill. A7 ......5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

**RAIL STEEL BARS**
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.50
Franklin,Pa.(3,4) F5...4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7 5.50
Marion,O.(3) P11 ......4.75
Moline,Ill.(3) R2 .......3.80
Tonawanda (3,4) B12 ..4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

**BARS, Wrought Iron**
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 ..12.25
Economy,Pa.(S.R.) B14 9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK Rks.(Staybolt) L5 14.60
McK Rks.(S.R.) L5 ....9.60
McKRks.(D.R.) L5...13.00

**BARS, Reinforcing (Fabricators)**
AlabamaCity,Ala. R2 ..3.70
Alton,Ill.(6) L1 ........3.70
Atlanta A11 ............4.25
Buffalo R2 ..............3.70
Cleveland R2 ..........3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .......3.70
Fontana,Calif. K1 ......4.40
Gary,Ind. U5 ..........3.70
Houston,Tex. S5 .......4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ......3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .........4.40
Milton,Pa. B6 ..........4.20
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 ..........5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ..........3.70
Portland,Oreg. O4 ......4.65
SandSprings,Okla. S5 ..4.60
Seattle B3, N14 .........4.45
So.Chicago,Ill. R2 ......3.70
So.Duquesne,Pa. U5 ...3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 .........3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

**BARS, Reinforcing**
(Fabricated: to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ...4.75
LosAngeles B3 .........5.45
Marion,O. P11 ..........5.00
Seattle B3, N14 .........5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2 ..4.75
Williamsport,Pa. S19 ..5.10

**SHEETS, Hot-Rolled Steel**
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.60
Ashland,Ky.(8) A10 ...3.60
Butler,Pa. A10 .........3.60
Cleveland J5, R2 .......3.60
Conshohocken,Pa. A3 ..4.00
Detroit M1 .............4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 .......3.60
Fontana,Calif. K1 ......4.55
Gary,Ind. U5 ..........3.60
Geneva,Utah G1 .......3.70
GraniteCity,Ill. G4 .....4.30
Ind.Harbor,Ind. I-2,Y1 3.60
Irvin,Pa. U5 ...........3.60
Lackawanna,N.Y. B2 ..3.60
Munhall,Pa. U5 .......3.60
Niles,O. N12 ..........5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 ..........*3.60*
Sharon,Pa. S3 ..........4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 ..........3.60
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.60

**SHEETS, H.R., (19 gage)**
AlabamaCity,Ala. R2 ...4.75
Dover,O. R1 ............5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 ........5.65
Niles,O. N12 ..........5.75
Torrance,Calif. C11 ....5.40

**SHEETS, H.R. (14-ga., heavier) High-Strength Low-Alloy**
Cleveland J5, R2 .......5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 .......5.95
Fairfield,Ala. T2 .......5.40
Fontana,Calif. K1 ......6.35
Gary,Ind. U5 ..........5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 ...........5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ..........5.40
Sharon,Pa. S3 ..........5.40
So.Chicago,Ill. U5 ......5.40
SparrowsPoint(36) B2 ..5.40
Warren,O. R2 ..........5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ........5.40
Youngstown Y1 ........5.90

**SHEETS, Cold-Rolled High-Strength Low-Alloy**
Cleveland J5, R2 .......6.55
Ecorse,Mich. G5 .......7.10
Fontana,Calif. K1 ......7.50
Gary,Ind. U5 ..........6.55
IndianaHarbor,Ind. Y1 .7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 ...........6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ..........6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 ..........6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ........7.05

### SHEETS, Cold-Rolled Steel (Commercial Quality)

| | |
|---|---|
| Butler,Pa. A10 | 4.35 |
| Cleveland J5, R2 | 4.35 |
| Ecorse,Mich. G5 | 4.55 |
| Fairfield,Ala. T2 | 4.35 |
| Follansbee,W.Va. F4 | 5.35 |
| Fontana,Calif. K1 | 5.30 |
| Gary,Ind. U5 | 4.35 |
| GraniteCity,Ill. G4 | 5.05 |
| Ind.Harbor,Ind. I-2, Y1 | 4.35 |
| Irvin,Pa. U5 | 4.35 |
| Lackawanna,N.Y. B2 | 4.35 |
| Middletown,O. A10 | 4.35 |
| Pittsburg,Calif. C11 | 5.30 |
| Pittsburgh J5 | 4.35 |
| SparrowsPoint,Md. B2 | 4.35 |
| Steubenville,O. W10 | 4.35 |
| Warren,O. R2 | 4.35 |
| Weirton,W.Va. W6 | 4.35 |
| Youngstown Y1 | 4.35 |

### SHEETS, Galv'd No. 10 Steel

| | |
|---|---|
| AlabamaCity,Ala. R2 | 4.80 |
| Ashland,Ky.(8) A10 | 4.80 |
| Canton,O. R2 | 4.80 |
| Dover,O. R1 | 5.50 |
| Fairfield,Ala. T2 | 4.80 |
| Gary,Ind. U5 | 4.80 |
| GraniteCity,Ill. G4 | 5.50 |
| Ind.Harbor,Ind. I-2 | 4.80 |
| Irvin,Pa. U5 | 4.80 |
| Kokomo,Ind.(13) C16 | 5.20 |
| MartinsFerry,O. W10 | 4.80 |
| Niles,O. N12 | 6.00 |
| Pittsburg,Calif. C11 | 5.55 |
| SparrowsPoint,Md. B2 | 4.80 |
| Steubenville,O. W10 | 4.80 |
| Torrance,Calif. C11 | 5.55 |
| Weirton,W.Va. W6 | 4.80 |

### SHEETS, Galvanized No. 10, High-Strength Low-Alloy

| | |
|---|---|
| Irvin,Pa. U5 | 7.20 |
| SparrowsPoint(39) B2 | 6.75 |

### SHEETS, Galvannealed Steel

| | |
|---|---|
| Canton,O. R2 | 5.35 |
| Irvin,Pa. U5 | 5.35 |
| Kokomo,Ind.(13) C16 | 5.75 |
| Niles,O. N12 | 6.55 |

### SHEETS, ZINCGRIP Steel No. 10

| | |
|---|---|
| Butler,Pa. A10 | 5.05 |
| Middletown,O. A10 | 5.05 |

### SHEETS, Electro Galvanized

| | |
|---|---|
| Cleveland R2 (28) | 5.65 |
| Niles,O. R2 (28) | 5.65 |
| Weirton,W.Va. W6 | 5.50 |

### SHEETS, Zinc Alloy

| | |
|---|---|
| Ind.Harbor,Ind. I-2 | 5.70 |

### SHEETS, Drum Body

| | |
|---|---|
| Pittsburg,Calif. C11 | 4.30 |
| Torrance,Calif. C11 | 4.30 |

### SHEETS, Well Casing

| | |
|---|---|
| Fontana,Calif. K1 | 5.10 |
| Torrance,Calif. C11 | 5.10 |

### BLUED Stock, 29 Ga.

| | |
|---|---|
| Yorkville,O. W10 | 6.80 |
| Follansbee,W.Va.(23)F4 | 6.85 |

### ROOFING SHORT TERNES (8 lb. coated)

| | |
|---|---|
| Gary,Ind. U5 | 9.50 |

### MANUFACTURING TERNES (Special Coated)

| | |
|---|---|
| Fairfield,Ala. T2 | $7.60 |
| Gary,Ind. U5 | 7.50 |
| Irvin,Pa. U5 | 7.50 |
| SparrowsPoint,Md. B2 | 7.60 |
| Yorkville,O. W10 | 7.50 |

### SHEETS, LT. Coated Ternes, 6 lb

| | |
|---|---|
| Yorkville,O. W10 | $8.40 |

### SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

| | |
|---|---|
| Gary,Ind. U5 | $9.50 |
| Yorkville,O. W10 | 9.50 |

### SHEETS, Long Terne Steel (Commercial Quality)

| | |
|---|---|
| BeechBottom,W.Va.W10 | 5.20 |
| Gary,Ind. U5 | 5.20 |
| Mansfield,O. E6 | 6.05 |
| Middletown,O. A10 | 5.20 |
| Niles,O. N12 | 6.00 |
| Weirton,W.Va. W6 | 5.20 |

### SHEETS, Long Terne, Ingot Iron

| | |
|---|---|
| Middletown,O. A10 | 5.60 |

### SHEETS, Enameling Iron

| | |
|---|---|
| Ashland,Ky. (8) A10 | 4.65 |
| Cleveland R2 | 4.65 |
| Gary,Ind. U5 | 4.65 |
| GraniteCity,Ill. G4 | 5.35 |
| Ind.Harbor,Ind. I-2 | 4.65 |
| Irvin,Pa. U5 | 4.65 |
| Middletown,O. A10 | 4.65 |
| Youngstown Y1 | 4.65 |

### SHEETS, Culvert No. 16

| | Cu Alloy | Cu Fe |
|---|---|---|
| Ashland A10 | 5.60 | ... |
| Canton,O. R2 | 5.65 | 6.10 |
| Fairfield,Ala. T2 | 5.60 | 5.85 |
| Gary, U5 | 5.60 | 5.85 |
| IndianaHarbor I-2 | 5.60 | 5.85 |
| Irvin,Pa. U5 | 5.60 | 5.85 |
| Kokomo C16 | 6.25 | ... |
| MartinsFy.O. W10 | 5.60 | 5.85 |
| Pittsburg,Cal. C11 | 6.35 | ... |
| SparrowsPt. B2 | 5.60 | ... |
| Torrance,Cal. C11 | 6.35 | ... |

### SHEETS, Culvert, No. 16 Pure Iron

| | |
|---|---|
| Ashland,Ky. A10 | 5.85 |
| Fairfield,Ala. T2 | 5.85 |

### SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

| | |
|---|---|
| Ashland(8) A10 | 3.85 |
| Cleveland R2 | 4.20 |
| Ind.Harbor,Ind. I-2 | 3.85 |
| Warren,O. R2 | 4.20 |

### SHEETS, Cold-Rolled Ingot Iron

| | |
|---|---|
| Cleveland R2 | 4.95 |
| Middletown,O. A10 | 4.85 |
| Warren,O. R2 | 4.95 |

### SHEETS, Galvanized Ingot Iron No. 10 flat

| | |
|---|---|
| Ashland,Ky.(8) A10 | 5.05 |
| Canton,O. R2 | 5.55 |

### SHEETS, ZINCGRIP Ingot Iron

| | |
|---|---|
| Butler,Pa. A10 | 5.30 |
| Middletown,O. A10 | 5.30 |

### SHEETS, ALUMINIZED

| | |
|---|---|
| Butler,Pa. A10 | 8.15 |

### TIN PLATE, American Coke (Base Box)

| | 1.25 lb | 1.50 lb |
|---|---|---|
| Aliquippa J5 | $8.45 | $8.70 |
| Fairfield,Ala. T2 | 8.55 | 8.80 |
| Gary U5 | 8.45 | 8.70 |
| Ind.Har. I-2, Y1 | 8.45 | 8.70 |
| Irvin,Pa. U5 | 8.45 | 8.70 |
| Pitts.,Cal. C11 | 9.20 | 9.45 |
| Sp.Pt.,Md. B2 | 8.55 | 8.80 |
| Warren R2 | 8.45 | 8.70 |
| Weirton W6 | 8.45 | 8.70 |
| Yorkville,O. W10 | 8.45 | 8.70 |

### BLACK PLATE (Base Box)

| | |
|---|---|
| Aliquippa J5 | $6.25 |
| Fairfield,Ala. T2 | 6.35 |
| Gary,Ind. U5 | 6.25 |
| GraniteCity,Ill. G4 | 6.45 |
| Ind.Harbor,Ind. I-2, Y1 | 6.25 |
| Irvin,Pa. U5 | 6.25 |
| Niles,O. R2 | 6.25 |
| Pittsburg,Calif. C11 | 7.00 |
| SparrowsPoint,Md. B2 | 6.35 |
| Warren,O. R2 | 6.25 |
| Weirton,W.Va. W6 | 6.25 |
| Yorkville,O. W10 | 6.25 |

### HOLLOWARE ENAMELING Black Plate (29 gage)

| | |
|---|---|
| Follansbee,W.Va. F4 | 5.85 |
| Gary,Ind. U5 | 5.85 |
| GraniteCity,Ill. G4 | 6.05 |
| Ind.Harbor,Ind. Y1 | 5.30 |
| Irvin,Pa. U5 | 5.85 |
| Yorkville,O. W10 | 6.15 |

### STRIP, Hot-Rolled Alloy

| | |
|---|---|
| Bridgprt,Conn.(10) S15 | 5.45 |
| Carnegie,Pa. S18 | 5.85 |
| Fontana,Calif. K1 | 6.70 |
| Gary,Ind. U5 | 5.50 |
| Houston,Tex. S5 | 5.90 |
| KansasCity,Mo. S5 | 6.10 |
| Midland,Pa. C18 | 5.85 |
| NewBritn,Conn.(10) S15 | 5.45 |
| Sharon,Pa. S8 | 5.85 |
| Youngstown U5 | 5.50 |

### STRIP, Hot-Rolled, High-Strength Low-Alloy

| | |
|---|---|
| Bessemer,Ala. T2 | 5.30 |
| Conshohocken,Pa. A3 | 5.55 |
| Ecorse,Mich. G5 | 5.95 |
| Fairfield,Ala. T2 | 5.30 |
| Fontana,Calif. K1 | 6.20 |
| Gary,Ind. U5 | 5.30 |
| Ind.Harb.,Ind. I-2 | 5.30 |
| IndianaHarbor,Ind. Y1 | 5.80 |
| Lackawanna,N.Y. B2 | 4.95 |
| LosAngeles(25) B3 | 6.05 |
| Seattle B3 | 6.30 |
| Sharon,Pa. S3 | 5.40 |
| So.SanFrancisco(25) B3 | 6.05 |
| SparrowsPoint,Md. B2 | 4.95 |
| Warren,O. R2 | 5.30 |
| Weirton,W.Va. W6 | 5.75 |
| Youngstown Y1 | 5.80 |
| Youngstown U5 | 5.30 |

### STRIP, Cold-Rolled, High-Strength Low-Alloy

| | |
|---|---|
| Cleveland J5 | 6.70 |
| Cleveland A7 | 6.55 |
| Dover,O. G6 | 7.30 |
| Fontana,Calif. K1 | 6.95 |
| Lackawanna,N.Y. B2 | 6.40 |
| Sharon,Pa. S3 | 6.55 |
| SparrowsPoint,Md. B2 | 6.40 |
| Warren,O. R2 | 6.55 |
| Weirton,W.Va. W6 | 7.20 |
| Youngstown Y1 | 7.05 |

### STRIP, Hot-Rolled Carbon

| | |
|---|---|
| Ala.City,Ala.(27) R2 | 3.50 |
| Alton,Ill.(1) L1 | 3.75 |
| Ashland,Ky.(8) A10 | 3.50 |
| Atlanta A11 | 4.95 |
| Bessemer,Ala. T2 | 3.50 |
| Bridgeprt,Conn.(10) S15 | 4.00 |
| Buffalo(27) R2 | 3.50 |
| Butler,Pa. A10 | 3.50 |
| Carnegie,Pa. S18 | 4.00 |
| Conshohocken,Pa. A3 | 3.90 |
| Detroit M1 | 4.40 |
| Ecorse,Mich. G5 | 3.80 |
| Fairfield,Ala. T2 | 3.50 |
| Fontana,Calif. K1 | 4.75 |
| Gary,Ind. U5 | 3.50 |
| Houston,Tex. S5 | 4.90 |
| Ind.Harbor,Ind. I-2, Y1 | 3.50 |
| Johnstown,Pa.(25) B2 | 3.50 |
| KansasCity,Mo.(9) S5 | 4.10 |
| Lackawanna,N.Y.(32)B2 | 3.50 |
| LosAngeles B3 | 4.25 |
| Milton,Pa. B6 | 4.00 |
| Minnequa,Colo. C10 | 4.55 |
| NewBritain(10) S15 | 4.00 |
| No.Tonawanda,N.Y. B11 | 3.50 |
| Pittsburg,Calif. C11 | 4.25 |
| Riverdale,Ill. A1 | 3.50 |
| SanFrancisco S7 | 4.85 |
| Seattle B3, N14 | 4.50 |
| Sharon,Pa. S3 | 4.00 |
| So.Chicago,Ill. W14 | 3.50 |
| So.SanFrancisco B3 | 4.25 |
| SparrowsPoint,Md. B2 | 3.50 |
| Torrance,Calif. C11 | 4.25 |
| Warren,O. R2 | 3.50 |
| Weirton,W.Va. W6 | 3.60 |
| WestLeechburg,Pa. A4 | 3.75 |
| Youngstown U5, Y1 | 3.50 |

### STRIP, Cold-Rolled Alloy Steel

| | |
|---|---|
| Bridgeprt,Conn.(10)S15 | 10.75 |
| Carnegie,Pa. S18 | 10.60 |
| Cleveland A7 | 10.00 |
| Dover,O. G6 | 10.50 |
| Fontana,Calif. K1 | 11.65 |
| Harrison,N.J. C18 | 10.60 |
| Midland,Pa. C18 | 10.60 |
| NewBritn,Conn.(10)S15 | 10.75 |
| Pawtucket,R.I.(11) N8 | 10.75 |
| Pawtucket,R.I.(12) N8 | 11.05 |
| Sharon,Pa. S3 | 10.60 |
| Worcester,Mass. A7 | 10.30 |
| Youngstown C8 | 10.60 |

### STRIP, Cold-Rolled Carbon

| | |
|---|---|
| Anderson,Ind.(40) G6 | 5.50 |
| Berea,O. C7 | 6.60 |
| Bridgprt,Conn.(10) S15 | 5.35 |
| Butler,Pa. A10 | 4.65 |
| Cleveland A7, J5 | 4.65 |
| Dearborn,Mich. D3 | 5.60 |
| Detroit D2 | 5.60 |
| Detroit M1 | 5.45 |
| Dover,O.(40) G6 | 5.50 |
| Ecorse,Mich. G5 | 4.85 |
| Follansbee,W.Va. F4 | 5.35 |
| Fontana,Calif. K1 | 6.30 |
| FranklinPark,Ill.(40)T6 | 4.90 |
| Ind.Harbor,Ind. I-2 | 4.90 |
| Lackawanna,N.Y. B2 | 4.65 |
| LosAngeles C1 | 6.40 |
| Mattapan,Mass. T6 | 5.50 |
| Middletown,O. A10 | 4.65 |
| NewBritain(10) S15 | 5.35 |
| NewCastle,Pa. B4 | 5.35 |
| NewCastle(40) E5 | 5.25 |
| NewHaven,Conn. D2 | 5.85 |
| NewHaven,Conn. A7 | 5.15 |
| Pawtucket,R.I. R3 | 6.00 |
| Pawtucket,R.I.(21) N8 | 5.85 |
| Riverdale,Ill.(40) A1 | 4.90 |
| Rome,N.Y. R6 | 5.10 |
| Sharon,Pa. S3 | 5.35 |
| SparrowsPoint,Md. B2 | 4.65 |
| Trenton,N.J. R5 | 6.00 |
| Wallingford,Conn. W2 | 5.85 |
| Warren,O.(40) T5 | 5.25 |
| Warren,O. R2 | 4.65 |
| Weirton,W.Va. W6 | 4.65 |
| Youngstown C8 (40) | 5.25 |
| Youngstown Y1 | 4.65 |

### STRIP, Electro Galvanized

| | |
|---|---|
| Dover,O. G6 | 5.50 |
| Warren,O. T5 | 5.25 |
| Weirton,W.Va. W6 | 4.65 |
| Youngstown C8 | 5.25 |

### STRIP, Cold-Finished, Spring Steel (Annealed)

| | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Berea,O. C7 | | 6.80 | 7.40 | 9.35 | 11.65 |
| Bridgeport,Conn.(10) S15 | 5.35 | 6.80 | 7.40 | 9.35 | 11.65 |
| Bristol,Conn. W1 | ... | | 7.70 | 9.65 | |
| Carnegie,Pa. S18 | ... | 6.80 | 7.40 | 9.35 | 11.65 |
| Cleveland A7 | 4.65 | 6.45 | 7.40 | 9.35 | 11.65 |
| Dearborn,Mich. D3 | 5.60 | 7.05 | 7.65 | ... | .... |
| Detroit D2 | 5.60 | 6.65 | 7.25 | ... | |
| Dover,O. G6 | 5.50 | 6.80 | 7.40 | 9.35 | 11.65 |
| FranklinPark,Ill. T6 | 5.00 | 6.60 | 7.55 | 9.50 | 11.80 |
| Harrison,N.J. C18 | ... | | 7.70 | 9.65 | 11.95 |
| Mattapan,Mass. T6 | 5.50 | 6.75 | 7.70 | 9.65 | 11.95 |
| NewBritn.,Conn.(10) S15 | 5.35 | 6.80 | 7.40 | 9.35 | 11.65 |
| NewCastle,Pa. B4 | 5.35 | 6.80 | 7.40 | 9.35 | ... |
| NewCastle,Pa. E5 | 5.50 | 6.80 | 7.40 | 9.35 | 11.65 |
| NewHaven,Conn. D2 | 5.85 | 6.75 | 7.35 | | ... |
| NewYork W3 | ... | 7.10 | 7.70 | 9.65 | 11.95 |
| Pawtucket,R.I. N8: | | | | | |
| Cleve.-or-Pitts.Base | ... | 6.80 | 7.40 | 9.35 | 11.65 |
| Worcester,Base | 5.85 | 7.10 | 7.70 | 9.65 | 11.95 |
| Sharon,Pa. S3 | 5.35 | 6.80 | 7.40 | 9.35 | 11.65 |
| Trenton,N.J. R5 | ... | 7.10 | 7.70 | 9.65 | 11.95 |
| Wallingford,Conn. W2 | 5.85 | 6.75 | 7.35 | 9.30 | 11.60 |
| Weirton,W.Va. W6 | 5.35 | 6.80 | 7.40 | 9.35 | 11.65 |
| Worcester,Mass. A7 | 4.95 | 6.75 | 7.70 | 9.65 | 11.95 |
| Worcester,Mass. T6 | 5.50 | 6.75 | 7.70 | 9.65 | 11.95 |
| Youngstown C8 | ... | 6.80 | 7.40 | 9.35 | 11.65 |

### Spring Steel (Tempered)

| | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Trenton,N.J. R5 | ... | ... | 10.30 | 12.50 | 15.35 |
| Harrison,N.J. C18 | ... | ... | 10.30 | 12.50 | 15.35 |
| NewYork W3 | ... | ... | 10.30 | 12.50 | 15.35 |

### TIN PLATE, Electrolytic (Base Box)

| | 0.25 lb | 0.50 lb | 0.75 lb |
|---|---|---|---|
| Aliquippa,Pa. J5 | $7.15 | $7.40 | $7.80 |
| Fairfield,Ala. T2 | 7.25 | 7.50 | 7.90 |
| Gary,Ind. U5 | 7.15 | 7.40 | 7.80 |
| GraniteCity,Ill. G4 | 7.35 | 7.60 | 8.00 |
| Ind.Harbor,Ind. I-2, Y1 | 7.15 | 7.40 | 7.80 |
| Irvin,Pa. U5 | 7.15 | 7.40 | 7.80 |
| Niles,O. R2 | 7.15 | 7.40 | 7.80 |
| Pittsburg,Calif. C11 | 7.90 | 8.15 | 8.55 |
| SparrowsPoint,Md. B2 | 7.25 | 7.50 | 7.90 |
| Weirton,W.Va. W6 | 7.15 | 7.40 | 7.80 |
| Yorkville,O. W10 | 7.15 | 7.40 | 7.80 |

### SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths ½c lower)

| | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| BeechBottom W10 (cut lengths) | ... | ... | 7.25 | 8.50 | 9.30 |
| Brackenridge,Pa. A4 | ... | | 7.75 | 9.00 | 9.80 |
| GraniteCity,Ill. G4 (cut lengths) | | | 7.95 | 9.20 | ... |
| Ind.Harbor,Ind. I-2 | 6.55 | 7.25 | (34) | | ... |
| Mansfield,O. E6 (cut lengths) | 7.10 | 7.25 | 7.75 | 9.00 | 9.80 |
| Niles,O. N12 (cut lengths) | ... | 6.75 | 7.25 | ... | ... |
| Vandergrift,Pa. U5 | ... | 7.25 | 7.75 | 9.00 | 9.80 |
| Warren,O. R2 | 6.95 | 7.25 | 7.75 | 9.00 | 9.80 |
| Zanesville,O. A10 | ... | 7.25 | 7.75 | 9.00 | 9.80 |

### SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade

| | 72 | 65 | 58 | 52 |
|---|---|---|---|---|
| BeechBottom W10 (cut lengths) | 9.85 | 10.40 | 11.10 | 11.90 |
| Brackenridge,Pa. A4 | 10.35 | .... | .... | .... |
| Vandergrift,Pa. U5 | 10.35 | 10.90 | 11.60 | 12.40 |
| Warren,O. R2 | 10.35 | .... | .... | .... |
| Zanesville,O. A10 | 10.35 | 10.90 | 11.60 | 12.40 |

### H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22Ga.)

| | T-100 | T-90 | T-80 | T-73 |
|---|---|---|---|---|
| Butler,Pa. A10 (C.R.) | .... | .... | 14.75 | 15.25 |
| Vandergrift,Pa. U5 | 12.90 | 13.75 | 14.75 | 15.25 |

## Key to Producers

| | |
|---|---|
| A1 | Acme Steel Co. |
| A3 | Alan Wood Steel Co. |
| A4 | Allegheny Ludlum Steel |
| A7 | American Steel & Wire |
| A8 | Anchor Drawn Steel Co. |
| A9 | Angell Nail & Chaplet |
| A10 | Armco Steel Corp. |
| A11 | Atlantic Steel Co. |
| A13 | American Cladmetals Co. |
| B1 | Babcock & Wilcox Tube |
| B2 | Bethlehem Steel Co. |
| B3 | Beth. Pac. Coast Steel |
| B4 | Blair Strip Steel Co. |
| B5 | Bliss & Laughlin Inc. |
| B6 | Boiardi Steel Corp. |
| B8 | Braeburn Alloy Steel |
| B11 | Buffalo Bolt Co. |
| B12 | Buffalo Steel Co. |
| B14 | A. M. Byers Co. |
| C1 | Calstrip Steel Corp. |
| C2 | Calumet Steel Div.<br>Borg-Warner Corp. |
| C4 | Carpenter Steel Co. |
| C5 | Central Iron & Steel Div.<br>Barium Steel Corp. |
| C7 | Cleve. Cold Rolling Mills |
| C8 | Cold Metal Products Co. |
| C9 | Colonial Steel Co. |
| C10 | Colorado Fuel & Iron |
| C11 | Columbia Steel Co. |
| C12 | Columbia Steel & Shaft |
| C13 | Columbia Tool Steel Co. |
| C14 | Compressed Steel Shaft |
| C16 | Continental Steel Corp. |
| C17 | Copperweld Steel Co. |
| C18 | Crucible Steel Co. |
| C19 | Cumberland Steel Co. |
| C20 | Cuyahoga Steel & Wire |
| C22 | Claymont Steel Corp. |
| D2 | Detroit Steel Corp. |
| D3 | Detroit Tube & Steel |
| D4 | Disston & Sons, Henry |
| D6 | Driver Harris Co. |
| D7 | Dickson Weatherproof<br>Nail Co. |
| E1 | Eastern Gas&Fuel Assoc. |
| E2 | Eastern Stainless Steel |
| E4 | Electro Metallurgical Co. |
| E5 | Elliott Bros. Steel Co. |
| E6 | Empire Steel Corp. |
| F2 | Firth Sterling Steel |
| F3 | Fitzsimons Steel Co. |
| F4 | Follansbee Steel Corp. |
| F5 | Franklin Steel Div.<br>Borg-Warner Corp. |
| F6 | Fretz-Moon Tube Co. |
| F7 | Ft. Howard Steel & Wire |
| G1 | Geneva Steel Co. |
| G2 | Globe Iron Co. |
| G3 | Globe Steel Tubes Co. |
| G4 | Granite City Steel Co. |
| G5 | Great Lakes Steel Corp. |
| G6 | Greer Steel Co. |
| H1 | Hanna Furnace Corp. |
| I-1 | Igoe Bros. Inc. |
| I-2 | Inland Steel Co. |
| I-3 | Interlake Iron Corp. |
| I-4 | Ingersoll Steel Div.,<br>Borg-Warner Corp. |
| J1 | Jackson Iron & Steel Co. |
| J3 | Jessop Steel Co. |
| J4 | Johnson Steel & Wire Co. |
| J5 | Jones & Laughlin Steel |
| J6 | Joslyn Mfg. & Supply |
| J7 | Judson Steel Corp. |
| J8 | Jersey Shore Steel Co. |
| K1 | Kaiser Steel Corp. |
| K2 | Keokuk Electro Metals |
| K3 | Keystone Drawn Steel |
| K4 | Keystone Steel & Wire |
| L1 | Laclede Steel Co. |
| L2 | LaSalle Steel Co. |
| L3 | Latrobe Electric Steel |
| L5 | Lockhart Iron & Steel |
| L6 | Lone Star Steel Co. |
| L7 | Lukens Steel Co. |

| STRIP, Hot-Rolled Ingot Iron | |
|---|---|
| Ashland,Ky. (8) A10 | 3.75 |
| Warren,O. R2 | 4.10 |

| STRIP, Cold-Rolled Ingot Iron | |
|---|---|
| Warren,O. R2 | 5.25 |

| TIGHT COOPERAGE HOOP | |
|---|---|
| Atlanta A11 | 4.05 |
| Riverdale,Ill. A1 | 3.90 |
| Sharon,Pa. S3 | 4.15 |
| Youngstown U5 | 3.75 |

| WIRE, Merchant Quality (6 to 8 gage) | An'ld | Galv. |
|---|---|---|
| AlabamaCity R2 | 5.70 | 5.95 |
| Aliquippa J5 | 5.70 | 6.15 |
| Atlanta A11 | 5.95 | 6.40 |
| Bartonville(19) K4 | 5.70 | 6.15 |
| Buffalo W12 | 4.85 | ... |
| Cleveland A7 | 5.70 | 6.15 |
| Crawfordsville M8 | 5.95 | 6.40 |
| Donora,Pa. A7 | 5.70 | 6.15 |
| Duluth,Minn. A7 | 5.70 | 6.15 |
| Fairfield T2 | 5.70 | 6.15 |
| Houston,Tex. S5 | 6.10 | 6.55 |
| Johnstown B2 | 5.70 | 6.15 |
| Joliet,Ill. A7 | 5.70 | 6.15 |
| KansasCy,Mo. S5 | 6.30 | 6.75 |
| Kokomo C16 | 5.80 | 6.05 |
| LosAngeles B3 | 6.65 | ... |
| Minnequa C10 | 5.95 | 6.45 |
| Monessen P7 | 5.95 | 6.40 |
| Palmer W12 | 5.15 | ... |
| Pitts,Calif. C11 | 6.65 | 6.80 |
| Prtsmth.(18)P12 | 6.10 | 6.60 |
| Rankin A7 | 5.70 | 6.15 |
| So.Chicago R2 | 5.70 | 5.95 |
| So.S.Fran. C10 | 6.65 | 7.10 |
| SparrowsPt. B2 | 5.80 | 6.25 |
| Sterling,Ill.(1)N15 | 5.70 | 6.15 |
| Struthers,O. Y1 | 5.70 | 6.15 |
| Torrance,Cal. C11 | 6.65 | ... |
| Worcester A7 | 6.00 | 6.45 |

| WIRE (16 gage) | An'ld Stone | Galv. Stone |
|---|---|---|
| Aliquippa J5 | 10.15 | 12.15 |
| Bartonville(1) K4 | 10.25 | 11.95 |
| Cleveland A7 | 10.25 | 12.15 |
| Crawfrdsvlle M8 | 10.30 | 12.00 |
| Fostoria,O. S1 | 10.40 | 13.00 |
| Johnstown B2 | 10.25 | 12.15 |
| Kokomo C16 | 10.25 | 11.95 |
| Minnequa C10 | 10.40 | 12.40 |
| Palmer,Mass.W12 | 10.25 | 12.15 |
| Pitts.Cal. C11 | 10.60 | 12.50 |
| Prtsmth.(18) P12 | 10.55 | 12.30 |
| SparrowsPt. B2 | 10.35 | 12.25 |
| Waukegan A7 | 10.25 | 12.15 |

| ROPE WIRE | (A) | (B) |
|---|---|---|
| Bartonville,Ill. K4 | 8.55 | 8.80 |
| Buffalo W12 | 8.55 | 8.80 |
| Fostoria,O. S1 | 8.85 | 9.10 |
| Johnstown,Pa. B2 | 8.55 | 8.80 |
| Monessen,Pa. P16 | 8.55 | 8.80 |
| Monessen,Pa. P7 | 8.80 | 9.05 |
| Palmer,Mass. W12 | 8.85 | 9.10 |
| Portsmouth,O. P12 | 8.55 | 8.80 |
| Roebling,N.J. R5 | 8.85 | 9.10 |
| SparrowsPt. B2 | 8.65 | 8.90 |
| Struthers,O. Y1 | 8.55 | 8.80 |
| Worcester J4, T6 | 8.85 | 9.10 |

(A) Plow and Mild Plow.
(B) Improved Plow.

| WIRE, Manufacturers Bright, Low Carbon | |
|---|---|
| AlabamaCity,Ala. R2 | 4.85 |
| Aliquippa,Pa. J5 | 4.85 |
| Atlanta A11 | 5.10 |
| Alton,Ill.(1) L1 | 4.85 |
| Bartonville,Ill.(1) K4 | 4.85 |
| Buffalo W12 | 4.85 |
| Chicago W13 | 5.10 |
| Cleveland A7, C20 | 4.85 |
| Crawfordsville,Ind. M8 | 5.10 |
| Donora,Pa. A7 | 4.85 |
| Duluth,Pa. A7 | 4.85 |
| Fairfield,Ala. T2 | 4.85 |
| Fostoria,O.(24) S1 | 5.35 |
| Houston S5 | 5.25 |
| Johnstown,Pa. B2 | 4.85 |
| Joliet,Ill. A7 | 4.85 |
| KansasCity,Mo. S5 | 5.45 |
| Kokomo,Ind. C16 | 4.95 |
| LosAngeles B3 | 5.80 |
| Minnequa,Colo. C10 | 5.10 |
| Monessen,Pa. P7 | 5.10 |
| Newark, 6-8 ga. I-1 | 5.50 |
| No.Tonawanda B11 | 4.85 |
| Palmer,Mass. W12 | 5.15 |
| Pittsburg,Calif. C11 | 5.80 |
| Portsmouth,O. P12 | 5.25 |
| Rankin,Pa. A7 | 4.85 |
| So.Chicago,Ill. R2 | 4.85 |
| So.SanFrancisco C10 | 5.80 |
| SparrowsPoint,Md. B2 | 4.95 |
| Sterling,Ill.(1) N15 | 4.85 |
| Struthers,O. Y1 | 4.85 |
| Torrance,Calif. C11 | 5.80 |
| Waukegan,Ill. A7 | 4.85 |
| Worcester,Mass. A7, T6 | 5.15 |

| WIRE, Cold-Rolled Flat | |
|---|---|
| Anderson,Ind. G6 | 6.20 |
| Buffalo W12 | 6.35 |
| Cleveland A7 | 5.85 |
| Crawfordsville,Ind. M8 | 6.20 |
| Detroit D2 | 6.20 |
| Dover,O. G6 | 6.20 |
| Fostoria,O. S1 | 6.00 |
| Kokomo,Ind. C16 | 5.70 |
| FranklinPark,Ill. T6 | 6.20 |
| Massillon,O. R8 | 5.85 |
| Monessen,Pa. P16 | 5.85 |
| Monessen,Pa. P7 | 6.10 |
| NewHaven,Conn. D2 | 6.50 |
| Pawtucket,R.I.(12) N8 | 6.85 |
| Trenton,N.J. R5 | 6.15 |
| Worcester A7 | 6.15 |
| Worcester T6 | 6.50 |
| Worcester W12 | 6.65 |

| WIRE, Fine & Weaving(8" Coils) | |
|---|---|
| Bartonville,Ill.(1) K4 | 8.90 |
| Buffalo W12 | 8.90 |
| Chicago W13 | 8.90 |
| Cleveland A7 | 8.90 |
| Crawfordsville,Ind. M8 | 8.95 |
| Fostoria,O. S1 | 8.90 |
| Johnstown,Pa. B2 | 8.90 |
| Kokomo,Ind. C16 | 8.90 |
| Monessen,Pa. P16 | 8.90 |
| Palmer,Mass. W12 | 9.20 |
| Portsmouth,O. P12 | 8.90 |
| Roebling,N.J. R5 | 9.20 |
| Waukegan, Ill. A7 | 8.90 |
| Worcester,Mass. A7, T6 | 9.20 |

| WIRE, Galv'd ACSR For Cores | |
|---|---|
| Bartonville,Ill. K4 | 8.50 |
| Monessen,Pa. P16 | 8.50 |
| Roebling,N.J. R5 | 8.80 |
| SparrowsPoint,Md. B2 | 8.60 |
| Johnstown,Pa. B2 | 8.50 |

| WIRE, Tire Bead | |
|---|---|
| Bartonville,Ill.(1) K4 | 10.90 |
| Monessen,Pa. P16 | 11.40 |
| Roebling,N.J. R5 | 11.55 |

| WIRE, MB Spring, High Carbon | |
|---|---|
| Aliquippa,Pa. J5 | 6.25 |
| Alton,Ill.(1) L1 | 6.25 |
| Bartonville,Ill.(1) K4 | 6.25 |
| Buffalo W12 | 6.25 |
| Cleveland A7 | 6.25 |
| Donora,Pa. A7 | 6.25 |
| Duluth A7 | 6.25 |
| Fostoria,O. S1 | 6.25 |
| Johnstown,Pa. B2 | 6.25 |
| LosAngeles B3 | 7.20 |
| Millbury,Mass.(12) N6 | 8.05 |
| Monessen,Pa. P7, P16 | 6.25 |
| Palmer,Mass. W12 | 6.55 |
| Pittsburg,Calif. C11 | 7.20 |
| Roebling,N.J. R5 | 6.55 |
| Portsmouth,O. P12 | 6.25 |
| So.Chicago,Ill. R2 | 6.25 |
| So.SanFrancisco C10 | 7.20 |
| SparrowsPoint,Md. B2 | 6.35 |
| Struthers,O. Y1 | 6.25 |
| Trenton,N.J. A7 | 6.55 |
| Waukegan,Ill. A7 | 6.25 |
| Worcester A7, T6, W12 | 6.55 |
| Worcester,Mass. J4 | 6.75 |

| WIRE, Upholstery Spring | |
|---|---|
| Aliquippa,Pa. J5 | 5.90 |
| Alton,Ill.(1) L1 | 5.90 |
| Buffalo W12 | 5.90 |
| Cleveland A7 | 5.90 |
| Donora,Pa. A7 | 5.90 |
| Duluth A7 | 5.90 |
| Johnstown,Pa. B2 | 5.90 |
| LosAngeles B3 | 6.85 |
| Monessen,Pa. P7, P16 | 5.90 |
| NewHaven,Conn. A7 | 6.20 |
| Palmer,Mass. W12 | 6.20 |
| Pittsburg,Calif. C11 | 6.85 |
| Portsmouth,O. P12 | 5.90 |
| Roebling,N.J. R5 | 6.20 |
| So.Chicago,Ill. R2 | 5.90 |
| So.SanFrancisco C10 | 6.85 |
| SparrowsPoint,Md. B2 | 6.00 |
| Torrance,Calif. C11 | 6.85 |
| Trenton,N.J. A7 | 6.20 |
| Waukegan,Ill. A7 | 5.90 |
| Worcester,Mass. A7 | 6.20 |

| WOVEN FENCE, 9-15½ Ga. | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 126 |
| Ala.City,Ala.,17-18ga.R2 | 213 |
| Aliquippa,Pa.9-14½ga.J5 | 130 |
| Atlanta A11 | 133 |
| Bartonville,Ill.(19) K4 | 130 |
| Crawfordsville,Ind. M8 | 132 |
| Donora,Pa. A7 | 130 |
| Duluth A7 | 130 |
| Fairfield,Ala. T2 | 130 |
| Houston,Tex. S5 | 138 |
| Johnstown,Pa. B2 | 130 |
| Johnstown,17ga.,6" B2 | 204 |
| Johnstown,17ga.,4" B2 | 207 |
| Joliet, Ill. A7 | 130 |
| KansasCity,Mo. S5 | 142 |
| Kokomo,Ind. C16 | 132 |
| Minnequa,Colo. C10 | 138 |
| Monessen,Pa. P7 | 135 |
| Pittsburg,Calif. C11 | 153 |
| Portsmouth,O.(18) P12 | 137 |
| Rankin,Pa. A7 | 130 |
| So.Chicago,Ill. R2 | 126 |
| Sterling,Ill.(1) N15 | 130 |

| FENCE POSTS | |
|---|---|
| ChicagoHts.,Ill. C2 | 140 |
| Duluth A7 | 125 |
| Franklin,Pa. F5 | 140 |
| Huntington,W.Va. W7 | 140 |
| Johnstown,Pa. B2 | 140 |
| Marion,O. P11 | 140 |
| Minnequa,Colo. C10 | 130 |
| Moline,Ill. R2 | 136 |
| So.Chicago R2 | 140 |
| Tonawanda B12 | 140 |
| Williamsport,Pa. S19 | 150 |

| WIRE, Barbed | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 136 |
| Aliquippa,Pa. J5 | 140 |
| Atlanta A11 | 143 |
| Bartonville,Ill.(19) K4 | 143 |
| Crawfordsville M8 | 145 |
| Donora,Pa. A7 | 140 |
| Duluth,Minn. A7 | 140 |
| Fairfield,Ala. T2 | 140 |
| Houston,Tex. S5 | 148 |
| Johnstown,Pa. B2 | 140 |
| Joliet,Ill. A7 | 140 |
| KansasCity,Mo. S5 | 152 |
| Kokomo,Ind. C16 | 142 |
| Minnequa,Colo. C10 | 146 |
| Monessen,Pa. P7 | 145 |
| Pittsburg,Calif. C11 | 160 |
| Portsmouth,O.(18) P12 | 147 |
| Rankin,Pa. A7 | 140 |
| So.Chicago,Ill. R2 | 136 |
| So.SanFran.,Calif. C10 | 160 |
| SparrowsPoint,Md. B2 | 142 |
| Sterling,Ill.(1) N15 | 140 |

| BALE TIES, Single Loop | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 123 |
| Atlanta A11 | 126 |
| Bartonville,Ill.(19) K4 | 123 |
| Crawfordsville M8 | 132 |
| Donora,Pa. A7 | 123 |
| Duluth,Minn. A7 | 123 |
| Fairfield,Ala. T2 | 123 |
| Joliet,Ill. A7 | 123 |
| KansasCity,Mo. S5 | 135 |
| Kokomo,Ind. C16 | 125 |
| Minnequa,Colo. C10 | 128 |
| Pittsburg,Calif. C11 | 147 |
| So.Chicago,Ill. R2 | 123 |
| So.SanFran.,Calif. C10 | 147 |
| SparrowsPoint,Md. B2 | 125 |
| Sterling,Ill.(1) N15 | 123 |

| NAILS & STAPLES, Non-Stock | |
|---|---|
| AlabamaCity,Ala. R2 | 6.10 |
| Bartonville,Ill.(19) K4 | 5.95 |
| Crawforsville,Ind. M8 | 6.30 |
| Donora,Pa. A7 | 5.95 |
| Duluth,Minn. A7 | 5.95 |
| Johnstown,Pa. B2 | 5.95 |
| Joliet,Ill. A7 | 5.95 |
| Kokomo,Ind. C16 | 6.05 |
| Minnequa,Colo. C10 | 6.20 |
| Pittsburg,Calif. C11 | 6.90 |
| Portsmouth,O. P12 | 6.25 |
| Rankin,Pa. A7 | 5.95 |
| So.Chicago,Ill. R2 | 6.10 |
| SparrowsPoint,Md. B2 | 6.05 |
| Sterling,Ill.(1) N15 | 5.65 |
| Worcester,Mass. A7 | 6.25 |

| NAILS, Cut (100 lb keg) To dealers (33) | |
|---|---|
| Conshohocken,Pa. A3 | $7.35 |
| Wheeling,W.Va. W10 | 7.35 |

| NAILS & STAPLES, Stock To dealers & mfrs. (7) | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 118 |
| Aliquippa,Pa. (13) J5 | 118 |
| Atlanta A11 | 121 |
| Bartonville,Ill.(19) K4 | 118 |
| Chicago,Ill. W13 | 118 |
| Cleveland A9 | 125 |
| Crawfordsville,Ind. M8 | 122 |
| Donora,Pa. A7 | 118 |
| Duluth,Minn. A7 | 118 |
| Fairfield,Ala. T2 | 118 |
| Galveston,Tex. D7 | 126 |
| Houston,Tex. S5 | 126 |
| Johnstown,Pa. B2 | 118 |
| Joliet,Ill. A7 | 118 |
| KansasCity,Mo. S5 | 130 |
| Kokomo,Ind. C16 | 120 |
| Minnequa,Colo. C10 | 123 |
| Monessen,Pa. P7 | 124 |
| Pittsburg,Calif. C11 | 137 |
| Portsmouth,O. P12 | 124 |
| Rankin,Pa. A7 | 118 |
| So.Chicago,Ill. R2 | [illegible]18 |
| SparrowsPoint,Md. B2 | 120 |
| Sterling,Ill.(1) N15 | 118 |
| Torrance,Calif. C11 | 138 |
| Worcester,Mass. A7 | 124 |

| STANDARD TRACK SPIKES | |
|---|---|
| Ind.Harbor,Ind. I-2, Y1 | 6.15 |
| KansasCity,Mo. S5 | 6.40 |
| Lebanon,Pa. B2 | 6.15 |
| Minnequa,Colo. C10 | 6.15 |
| Pittsburgh J5 | 6.15 |
| Seattle B3 | 6.65 |
| So.Chicago,Ill. R2 | 6.15 |
| Struthers,O. Y1 | 6.15 |
| Youngstown R2 | 6.15 |

| TRACK BOLTS (20) Treated | |
|---|---|
| KansasCity,Mo. S5 | 9.85 |
| Lebanon,Pa.(32) B2 | 9.85 |
| Minnequa,Colo. C10 | 9.85 |
| Pittsburgh O3, P14 | 9.85 |
| Seattle B3 | 10.35 |

| TIE PLATES | |
|---|---|
| Fairfield,Ala. T2 | 4.50 |
| Gary,Ind. U5 | 4.50 |
| Ind.Harbor,Ind. I-2 | 4.50 |
| Lackawanna,N.Y. B2 | 4.50 |
| Minnequa,Colo. C10 | 4.50 |
| Pittsburg,Calif. C11 | 4.65 |
| Seattle B3 | 4.65 |
| Steelton,Pa. B2 | 4.50 |
| Torrance,Calif. C11 | 4.65 |

| JOINT BARS | |
|---|---|
| Bessemer,Pa. U5 | 4.70 |
| Fairfield,Ala. T2 | 4.70 |
| Ind.Harbor,Ind. I-2 | 4.70 |
| Joliet,Ill. U5 | 4.70 |
| Lackawanna,N.Y. B2 | 4.70 |
| Minnequa,Colo. C10 | 4.70 |
| Steelton,Pa. B2 | 4.70 |

| AXLES | |
|---|---|
| Ind.Harbor,Ind. S18 | 5.60 |
| Johnstown,Pa. B2 | 5.60 |

| RAILS | Std. No. 1 | Std. No. 2 | Std. All No. 2 | Tee Rails 60 lb Under |
|---|---|---|---|---|
| Bessemer,Pa. U5 | 3.60 | 3.50 | 3.55 | 4.00 |
| Ensley,Ala. T2 | 3.60 | 3.50 | ... | 4.00 |
| Fairfield,Ala. T2 | ... | ... | ... | 4.00 |
| Gary,Ind. U5 | 3.60 | 3.50 | 3.55 | ... |
| Huntington,W.Va. W7 | ... | ... | ... | 5.00 |
| Ind.Harbor,Ind. I-2 | 3.60 | 3.50 | 3.55 | ... |
| Johnstown,Pa. B2 | ... | ... | ... | (16)4.00 |
| Lackawanna B2 | 3.60 | 3.50 | ... | 4.00 |
| Minnequa,Colo. C10 | 3.60 | 3.50 | ... | 4.50 |
| Steelton,Pa. B2 | 3.60 | 3.50 | ... | ... |
| Williamsport,Pa. S19 | ... | ... | ... | 4.75 |

## TOOL STEEL

| Grade | Cents per lb | Grade | Cents per lb |
|---|---|---|---|
| Reg. Carbon | 23.00 | 13.5W,4Cr,3V | 140.00 |
| Extra Carbon | 27.00 | 18W,4Cr,2V,9Co | 217.50 |
| Spec. Carbon | 32.50 | 19W,4Cr,2V,7Co | 217.50 |
| Oil Hardening | 35.00 | 18.25W,4.25Cr,1V,4.75Co | 185.50 |
| Cr. Hot Wrk | 35.00 | 20.25W,4.25Cr,1.6V,12.25Co | 323.00 |
| Hi-Carbon-Cr | 63.50 | 1.5W,4Cr,1V,8.5Mo | 78.50 |
| 18W,4Cr,1V | 123.50 | 6.4W,4.5Cr,1.9V,5Mo | 87.00 |
| 18W,4Cr,2V | 138.00 | 6W,4Cr,3V,6Mo | 109.50 |

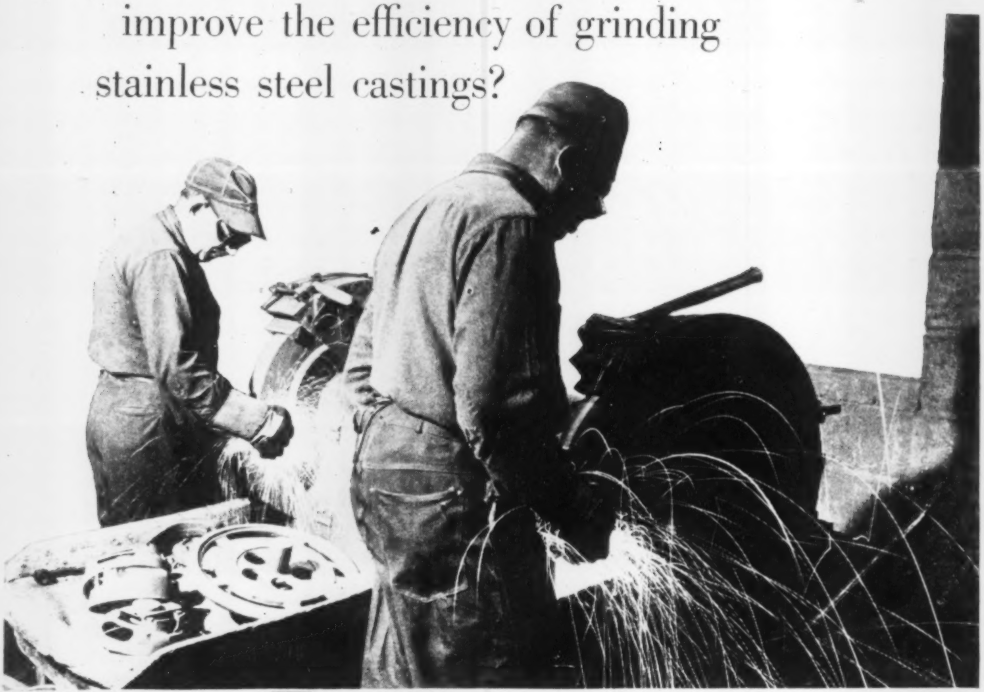
Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

## Key to Producers

| | |
|---|---|
| M1 | McLouth Steel Corp. |
| M4 | Mahoning Valley Steel |
| M5 | Medart Co. |
| M6 | Mercer Tube & Mfg. Co. |
| M8 | Mid-States Steel & Wire |
| M9 | Midvale Co. |
| M12 | Moltrup Steel Products |
| M13 | Monarch Steel Co. |
| M14 | McInnes Steel Co. |
| N2 | National Supply Co. |
| N3 | National Tube Co. |
| N5 | Nelsen Steel & Wire Co. |
| N6 | NewEng.HighCarb.,Wire |
| N8 | Newman-Crosby Steel |
| N12 | Niles Rolling Mill Co. |
| N14 | Nrthwst. Steel Roll. Mills |
| N15 | Northwestern S.&W. Co. |
| N16 | New Delphos Mfg. Co. |
| O3 | Oliver Iron & Steel Corp. |
| O4 | Oregon Steel Mills |
| P1 | Pacific States Steel Corp. |
| P2 | Pacific Tube Co. |
| P4 | Phoenix Iron & Steel Co. |
| P5 | Pilgrim Drawn Steel |
| P6 | Pittsburgh Coke & Chem. |
| P7 | Pittsburgh Steel Co. |
| P9 | Pittsburgh Tube Co. |
| P11 | Pollak Steel Co. |
| P12 | Portsmouth Division, Detroit Steel Corp. |
| P13 | Precision Drawn Steel |
| P14 | Pitts. Screw & Bolt Co. |
| P15 | Pittsburgh Metallurgical |
| P16 | Page Steel & Wire Div., Amer. Chain & Cable |
| P17 | Plymouth Steel Co. |
| R1 | Reeves Steel & Mfg. Co. |
| R2 | Republic Steel Corp. |
| R3 | Rhode Island Steel Corp. |
| R5 | Roebling's Sons, John A. |
| R6 | Rome Strip Steel Co. |
| R7 | Rotary Electric Steel Co. |
| R8 | RelianceDiv.,EatonMfg. |
| S1 | Seneca Wire & Mfg. Co. |
| S3 | Sharon Steel Corp. |
| S5 | Sheffield Steel Corp. |
| S6 | Shenango Furnace Co. |
| S7 | Simmons Co. |
| S8 | Simonds Saw & Steel Co. |
| S9 | Sloss-Sheffield, S.&I. Co. |
| S13 | Standard Forgings Corp. |
| S14 | Standard Tube Co. |
| S15 | Stanley Works |
| S16 | Struthers Iron & Steel |
| S17 | Superior Drawn Steel Co. |
| S18 | Superior Steel Corp. |
| S19 | Sweet's Steel Co. |
| S20 | Southern States Steel |
| T2 | Tenn. Coal, Iron & R.R. |
| T3 | Tenn. Prod. & Chem. |
| T4 | Texas Steel Co. |
| T5 | Thomas Steel Co. |
| T6 | Thompson Wire Co. |
| T7 | Timken Roller Bearing |
| T9 | Tonawanda Iron Div. Am. Rad. & Stan. San. |
| U1 | Ulster Iron Works |
| U4 | Universal Cyclops Steel |
| U5 | United States Steel Co. |
| V2 | Vanadium-Alloys Steel |
| V3 | Vulcan Crucible Steel Co. |
| W1 | Wallace Barnes Co. |
| W2 | Wallingford Steel Co. |
| W3 | Washburn Wire Co. |
| W4 | Washington Steel Corp. |
| W6 | Weirton Steel Co. |
| W7 | W. Va. Steel & Mfg. Co. |
| W8 | West.Auto.Mach.Screw |
| W9 | Wheatland Tube Co. |
| W10 | Wheeling Steel Corp. |
| W12 | Wickwire Spencer Steel Div., Colo. Fuel & Iron |
| W13 | Wilson Steel & Wire Co. |
| W14 | Wisconsin Steel Div. International Harvester |
| W15 | Woodward Iron Co. |
| W18 | Wyckoff Steel Co. |
| Y1 | YoungstownSheet&Tube |

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

# What's U. S. Rubber doing to improve the efficiency of grinding stainless steel castings?



**GRINDING STAINLESS STEEL CASTINGS.** This large foundry specifies "U.S." wheels: prefers them because they grind with high efficiency and treat the castings right.

**GRINDING THE "GATES"** off a stainless steel valve housing casting, with a U.S. *Royalite* wheel.

**CLOSE-UP** of high-speed portable grinder smoothing castings.

Backed by over 88 years of experience in the abrasive industry, U.S. Rubber technicians have developed wheels that efficiently handle even the specialized problems presented when grinding stainless steel. This extensive "know-how" also puts U.S. Rubber in a position to provide you with wheels for grinding malleable iron, gray iron, steel, and Mechanite castings. There is a U.S. *Royalite* wheel for your job. Put your grinding wheel problem in the hands of U.S. Rubber technicians. Write to address below.

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UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

## STANDARD PIPE, T. & C.

**BUTTWELD**

| Size Inches | List Per Ft | Pounds Per Ft | Carload Discounts from List, % Black A | B | C | Galvanized D | E | F |
|---|---|---|---|---|---|---|---|---|
| ⅛ | 5.5c | 0.24 | 34.0 | 32.0 | 29.0 | 1.5 | +0.5 | +3.5 |
| ¼ | 6.0 | 0.42 | 28.5 | 26.5 | 23.5 | +1.0 | +3.0 | +6.0 |
| ⅜ | 6.0 | 0.57 | 23.5 | 21.5 | 18.5 | +7.0 | +9.0 | +12.0 |
| ½ | 8.5 | 0.85 | 36.0 | 34.0 | 35.0 | 14.0 | 12.0 | 13.0 |
| ¾ | 11.5 | 1.18 | 39.0 | 37.0 | 38.0 | 18.0 | 16.0 | 17.0 |
| 1 | 17.0 | 1.68 | 41.5 | 39.5 | 40.5 | 21.5 | 19.5 | 20.5 |
| 1¼ | 23.0 | 2.28 | 42.0 | 44.0 | 41.0 | 22.0 | 24.0 | 21.0 |
| 1½ | 27.5 | 2.78 | 42.5 | 41.5 | 41.5 | 23.0 | 21.5 | 22.0 |
| 2 | 37 | 3.68 | 43.0 | 41.0 | 42.0 | 23.5 | 21.5 | 22.5 |
| 2½ | 58.5 | 5.82 | 43.5 | 41.5 | 42.5 | 24.0 | 22.0 | 23.0 |
| 3 | 76.5 | 7.62 | 43.5 | 41.5 | 42.5 | 24.0 | 22.0 | 23.0 |

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ¼-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

**SEAMLESS AND ELECTRIC WELD**

| Size Inches | List Per Ft | Pounds Per Ft | Carload Discounts from List, % Seamless Black A | Galv. B | Elec. Weld Black C | Galv. D |
|---|---|---|---|---|---|---|
| 2 | 37.0c | 3.68 | 29.5 | 9.5 | 29.5 | 9.5 |
| 2½ | 58.5 | 5.82 | 32.5 | 12.5 | 32.5 | 12.5 |
| 3 | 76.5 | 7.62 | 32.5 | 12.5 | 32.5 | 12.5 |
| 3½ | 92.0 | 9.20 | 34.5 | 14.5 | 34.5 | 14.5 |
| 4 | $1.09 | 10.89 | 34.5 | 14.5 | 34.5 | 14.5 |
| 5 | 1.48 | 14.81 | 37.0 | 17.0 | 37.0 | 17.0 |
| 6 | 1.92 | 19.18 | 37.0 | 17.0 | 37.0 | 17.0 |

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

## BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

| O.D. In. | B.W. Ga. | Seamless H.R. | C.D. | Elec. Weld H.R. | C.D. |
|---|---|---|---|---|---|
| 1 | 13 | 13.45 | 16.47 | 15.36 | 15.36 |
| 1¼ | 13 | 16.09 | 19.71 | 15.61 | 18.19 |
| 1½ | 13 | 17.27 | 21.15 | 17.25 | 20.30 |
| 1¾ | 13 | 19.29 | 23.62 | 19.62 | 23.09 |
| 2 | 13 | 21.62 | 26.48 | 21.99 | 25.86 |
| 2¼ | 13 | 24.35 | 29.82 | 24.50 | 28.84 |
| 2¼ | 12 | 26.92 | 32.97 | 26.98 | 31.76 |
| 2½ | 12 | 29.65 | 36.32 | 29.57 | 34.76 |
| 2¾ | 12 | 32.11 | 39.33 | 31.33 | 36.84 |
| 3 | 12 | 34.00 | 41.64 | 32.89 | 38.70 |

## CLAD STEELS

(Cents per pound)

| Cladding Stainless | Plates Carbon Base 10% | 20% | Strip Cold-Rolled Carbon Base 10% | Both Sides | Sheets Carbon Base 10% | 20% | Cu Base Both Sides |
|---|---|---|---|---|---|---|---|
| 302 | .... | .... | .... | .... | 19.75 | 27.50 | 77.00 |
| 304 | 25.00 | 28.00-29.50 | .... | .... | 20.75-24.50 | 27.50 | 77.00 |
| 309 | 30.50 | 35.00 | .... | .... | .... | .... | .... |
| 310 | 36.50 | 41.00 | .... | .... | .... | .... | 144.00 |
| 316 | 29.50 | 31.50-34.00 | .... | .... | 26.00 | 36.50 | .... |
| 317 | 34.50 | 39.00 | .... | .... | .... | .... | .... |
| 318 | 38.50 | 38.00 | .... | .... | .... | .... | .... |
| 321 | 26.50 | 31.00 | .... | .... | 23.00 | 33.00 | 111.00 |
| 347 | 27.50 | 30.50-32.00 | .... | .... | 24.00 | 33.50 | 130.00 |
| 405 | 21.25 | 27.75 | .... | .... | .... | .... | .... |
| 410 | 20.75 | 27.25 | .... | .... | .... | .... | .... |
| Nickel | 33.25 | 44.25 | 41.00 | 54.00 | .... | .... | .... |
| Inconel | 41.00 | 53.50 | .... | .... | .... | .... | 165.00 |
| Monel | 34.75 | 45.75 | .... | .... | .... | .... | .... |
| Copper* | .... | .... | 23.70† | 29.65‡ | .... | .... | .... |

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-1, stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

## BOLTS, NUTS

### CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

| | |
|---|---|
| 6 in. and shorter: | |
| ½-in. & smaller diam. | 15 |
| 7/16-in. & ⅝-in. | 18.5 |
| ¾-in. and larger | 17.5 |
| Longer than 6 in.: | |
| All diams. | 14 |
| Lag bolts, all diams.: | |
| 6 in. and shorter | 23 |
| over 6 in. long | 21 |
| Ribbed Necked Carriage | 18.5 |
| Blank | 34 |
| Plow | 34 |
| Step, Elevator, Tap, and Sleigh Shoe | 21 |
| Tire bolts | 12 |
| Boiler & Fitting-Up bolts | 31 |

### NUTS

| H.P. & C.P. | Reg. | Heavy |
|---|---|---|
| Square: | | |
| ½-in. & smaller | 15 | 15 |
| 9/16-in. & ⅝-in. | 12 | 6.5 |
| ¾-in.-1½-in. | 9 | 1 |
| 1⅝-in. & larger | 7.5 | 1 |
| H.P. Hex: | | |
| ½-in. & smaller | 26 | 22 |
| 9/16-in. & ⅝-in. | 16.5 | 6.5 |
| ¾-in.-1½-in. | 12 | 2 |
| 1⅝-in. & larger | 8.5 | 2 |
| C.P. Hex.: | | |
| ½-in. & smaller | 26 | 22 |
| 9/16-in. & ⅝-in. | 23 | 17.5 |
| ¾-in. & 1½-in. | 19.5 | 12 |
| 1⅝-in. & larger | 12 | 6.5 |

### SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

| | Reg. | Hvy. |
|---|---|---|
| ½-in. & smaller | 35 | 28.5 |
| 9/16-in. & ⅝-in. | 29.5 | 22 |
| ¾-in.-1½-in. | 24 | 15 |
| 1⅝-in. & larger | 13 | 8.5 |
| | | Light |
| 7/16-in. & smaller | | 35 |
| ½-in. to ⅝-in. | | 28.5 |
| ¾-in. to 1½-in. | | 26 |

### STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ......48 & 10
Plated finishes ...31 & 10

### HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

| | |
|---|---|
| 6 in. or shorter: | |
| ⅝-in. & smaller | 42 |
| ¾-in. through 1 in. | 34 |
| Longer than 6 in.: | |
| ⅝-in. & smaller | 26 |
| ¾-in. through 1 in. | 4 |

### SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

| | |
|---|---|
| 1 in. diam. x 6 in. and shorter | 38 |
| 1 in. and smaller diam. x over 6 in. | 26 |

### HEADLESS SET SCREWS

(Packaged; per cent off list)

| | |
|---|---|
| No. 10 and smaller | 35 |
| ¼-in. diam. & larger | 16 |
| N.F. thread, all diams. | 10 |

## RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

7/16-in. under ........ 36 off

## WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-50c.

## ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

### GRAPHITE

| Inches Diam. | Length | Cents per lb |
|---|---|---|
| 17,18,20 | 60,72 | 17.85 |
| 8 to 16 | 48,60,72 | 17.85 |
| 7 | 48,60 | 19.57 |
| 6 | 48,60 | 20.95 |
| 4,5⅛ | 40 | 21.50 |
| 3 | 40 | 22.61 |
| 2½ | 24,30 | 23.15 |
| 2 | 24,30 | 25.36 |
| **CARBON** | | |
| 40 | 100,110 | 8.03 |
| 35 | 100,110 | 8.03 |
| 30 | 84,110 | 8.03 |
| 24 | 72 to 104 | 8.03 |
| 17 to 20 | 84,90 | 8.03 |
| 14 | 60,72 | 8.57 |
| 10,12 | 60 | 8.84 |

## STAINLESS STEEL

| Type | Sheets | C.R. Strip | Bars Wire Structurals |
|---|---|---|---|
| 301... | 41.00 | 34.00 | 31.25 |
| 302... | 41.00 | 36.50 | 31.25 |
| 303... | 43.00 | 40.00 | 33.75 |
| 304... | 43.00 | 38.50 | 32.75 |
| 309... | 56.50 | 54.50 | 44.25 |
| 316... | 56.50 | 58.50 | 48.75 |
| 321... | 49.00 | 48.00 | 36.75 |
| 347... | 53.50 | 52.00 | 41.25 |
| 410... | 36.50 | 30.50 | 25.75 |
| 416... | 37.00 | 37.00 | 26.25 |
| 420... | 44.00 | 47.00 | 31.25 |
| 430... | 39.00 | 31.00 | 26.25 |
| 501... | 27.50 | 26.00 | 14.25 |
| 502... | 28.50 | 27.00 | 15.25 |

Baltimore, Types 301 through 347 sheet, except 309 E2.
Brackenridge, Pa., sheets A4*
Bridgeville, Pa., bars, wire, sheets & strip U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.
Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502, S18.
Cleveland, strip, A7†
Detroit, strip, except Types 303, 309, 321, 416, 420, 501 and 502 M1.
Dunkirk, N. Y., bars, wire A4*
Duquesne, Pa., bars U5†
Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6†.
Gary, Ind., sheets except type 416 U5†.
Harrison, N. J., Types 302, 304 and 316 strip and wire C18‡.
Massillon, O., all products, R2
McKeesport, Pa., bars, sheets except Type 416 U5†.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.‡
Munhall, Pa., bars U5†.
Pittsburgh, sheets C18.‡
Reading, Pa., bars and strip, except 55.50c for Type 309 strip and 44.75c for Type 309 bars, C4.
Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.‡
So. Chicago, Ill., bars & structurals U5†.
Syracuse, N. Y., bars, wire & structurals C18.‡
Titusville, Pa., bars, U4.
Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.
Washington, Pa., bars, sheets & strip, except Type 309 sheets 56.00c and bars 44.75c, J3**.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 61.50c, strip 63.00c, W4††.
Watervliet, N. Y., structurals & bars A4*.
Waukegan, bars & wire A7†.
West Leechburg, Pa., strip, A4*
Youngstown, strip, except Types* 303, 309, 316, 416, 501 and 502 C8.

Higher prices quoted: *June 26; †July 2; ‡June 27; §July 9; **June 28; ††July 16.

## COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol .....30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xylol ..25.00-33.50

Per ton bulk, ovens
Sulphate of ammonia $32-$45

Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ...17.25

## FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective $CaF_2$ content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

## METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

| Sponge iron | Cents |
|---|---|
| 98+% Fe, carlots.. | 16.00 |
| Swedish, c.i.f. New York, in bags ... | 7.40-8.50 |
| Electrolytic Iron: | |
| Annealed, 99.5% Fe. | 42.50 |
| Unannealed, 99+% Fe | 36.50 |
| Unannealed, 99+% Fe (minus 325 mesh) | 58.50 |
| Powder Flakes | 48.50 |
| Carbonyl Iron: | |
| 97.9-99.8%, size 5 to 10 microns ... | 83.00-148.00 |
| Aluminum: | |
| Carlots, freight allowed | 29.50 |
| Atomized, 500 lb drums, freight allowed | 33.50 |
| Brass, 10-ton lots | 30.00-33.25 |
| Bronze, 10-ton lots | 51.25-60.00 |
| Phosphor-Copper, 10 tons | 50.00 |
| Copper: | |
| Electrolytic | 43.25 |
| Reduced | 33.75-37.00 |
| Lead | 25.50 |
| Magnesium | 75.00-85.00 |
| Manganese: | |
| Minus 100-mesh | 57.00 |
| Minus 35 mesh | 52.00 |
| Minus 200 mesh | 62.00 |
| Nickel unannealed | 83.00 |
| Nickel-Silver, 10-ton lots | 44.00 |
| Silicon | 38.50 |
| Solder (plus cost of metal) | 8.50 |
| Stainless Steel, 302 | 83.00 |
| Zinc, 10-ton lots | 23.00-30.50 |
| Tungsten: | Dollars |
| 99%, minus 80 to 200 mesh, freight allowed: | |
| 1000 lb and over | 4.00 |
| Les than 1000 lb | 4.15 |
| 98.8% minus 65 mesh, freight allowed: | |
| 1000 lb and over | 4.15 |
| Less than 1000 lb | 4.25 |
| Molybdenum: | |
| 99%, minus 80 to 200 mesh, | |
| over 500 lb | 2.85 |
| 200 to 500 lb | 3.10 |
| less than 200 lb | 3.25 |
| Chromium, electrolytic 99% Cr min. | 3.50 |

## METALLURGICAL COKE

Price per net ton

### BEEHIVE OVENS

| | |
|---|---|
| Connellsvll.fur. | $14.50-15.00 |
| Connellsvll.fdry. | 17.00-18.00 |
| New River, foundry | 21.30 |
| Wise county, foundry | 15.95 |
| Wise county, furnace | 15.20 |

### OVEN FOUNDRY COKE

| | |
|---|---|
| Kearney, N. J., ovens | $22.75 |
| Everett, Mass., ovens New England, del. | *24.80 |
| Chicago ovens | 23.00 |
| Chicago, del. | 24.40 |
| Terre Haute, ovens | 22.50 |
| Milwaukee, ovens | 23.75 |
| Indianapolis, ovens | 22.75 |
| Chicago, del. | 26.28 |
| Cincinnati, del. | 25.73 |
| Detroit, del. | 26.71 |
| Ironton, O., ovens | 22.50 |
| Cincinnati, del. | 25.12 |
| Painesville, O., ovens | 24.00 |
| Cleveland, del. | 25.75 |
| Erie, Pa., ovens | 23.50 |
| Birmingham, ovens | 20.30 |
| Birmingham, del. | 21.69 |
| Philadelphia, ovens | 22.70 |
| NevilleIsland Pa. ovens | 23.00 |
| Swedeland, Pa., ovens | 22.60 |
| St. Louis ovens St. Louis, del. | 25.40 |
| Portsmouth, O., oven | 22.50 |
| Cincinnati, del. | 25.12 |
| Detroit, ovens | 24.00 |
| Detroit, del. | 25.00 |
| Buffalo, del. | 26.75 |
| Flint, del. | 26.49 |
| Pontiac, del. | 25.42 |
| Saginaw, del. | 26.81 |

* Or within $4.15 freight zone from works.

# This 'dust' man can be your best friend

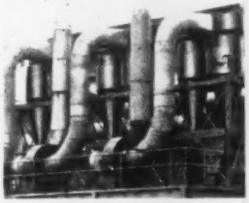
*If you ask him about the Most Efficient, Most Economical Method of collecting Nuisance Dust*

Wherever objectionable dust goes uncontrolled, you aggravate employee morale; you impair plant-community relations.

In either case, a Buell "dust" man can probably help. That's his job, and he is backed by more than 200 man-years of experience in solving industrial Nuisance Dust problems. We think you'll agree, too, that Buell's knowledge of dust is the reason why so many Utility and plant operators include us among their best business friends.

If you have questions regarding the latest advance in nuisance-dust Collection Equipment – its design, construction, and operating characteristics, a letter today will bring a quick reply. And – ask for the new, self-indexed Buell Dust Collection bulletin. Buell Engineering Company, Dept. 26-G, 70 Pine Street, New York 5, N. Y.

industrial dusts



Buell Cyclones installed in series to collect nuisance dust at a steel plant. High efficiency operation is assured by exclusive 'Shave-off' feature.

**buell®**

ELECTRIC
CYCLONIC

HIGH-EFFICIENCY CYCLONES
ELECTRIC PRECIPITATORS
'LR' COLLECTORS
LOW DRAFT LOSS COLLECTORS
SPECIAL PURPOSE COLLECTORS
DUST HOPPER VALVES

ENGINEERED EFFICIENCY IN **DUST COLLECTION**

# WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

| | SHEETS | | | STRIP | | BARS | | | Standard Structural Shapes | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | H.R. 18 Ga., Heavier* | C.R. | Gal. 10 Ga.† | H.R.* | C.R.* | H.R. Rds. | C.F. Rds. | H.R. Alloy 4140§ | | Carbon | Floor |
| New York (city) | 6.27 | 7.29 | 8.44 | 6.59 | ... | 6.42 | 7.29 | 9.25 | 6.40 | 6.58 | 8.04 |
| New York (c'try) | 5.97 | 6.99 | 8.14 | 6.29 | ... | 6.12 | 6.99 | 8.95 | 6.10 | 6.28 | 7.74 |
| Boston (city) | 6.40 | 7.20 | 8.49 | 6.35 | ... | 6.25 | 7.04 | 9.25 | 6.40 | 6.98 | 7.88 |
| Boston (c'try) | 6.20 | 7.00 | 8.29 | 6.15 | ... | 6.05 | 6.84 | 9.05 | 6.20 | 6.78 | 7.68 |
| Phila. (city) | 6.15 | 7.05 | 8.25 | 6.35 | ... | 6.30 | 7.11 | 8.90 | 6.15 | 6.30 | 7.40 |
| Phila. (c'try) | 5.90 | 6.80 | 8.00 | 6.10 | ... | 6.05 | 6.86 | 8.65 | 5.90 | 6.05 | 7.15 |
| Balt. (city) | 5.80 | 7.04 | 8.27 | 6.24 | ... | 6.24 | 7.09 | ... | 6.34 | 6.00 | 7.64 |
| Balt. (c'try) | 5.60 | 6.84 | 8.07 | 6.04 | ... | 6.04 | 6.89 | ... | 6.14 | 5.80 | 7.44 |
| Norfolk, Va. | 6.50 | ... | ... | 6.70 | ... | 6.55 | 7.70 | ... | 6.60 | 6.50 | 8.00 |
| Richmond, Va. | 5.90 | ... | 8.10 | 6.10 | ... | 6.10 | 6.90 | ... | 6.30 | 6.05 | 7.80 |
| Wash. (w'hse) | 6.02 | 7.26 | 8.49 | 6.46 | ... | 6.46 | 7.26 | ... | 6.56 | 6.22 | 7.86 |
| Buffalo (del.) | 5.80 | 6.60 | 8.29 | 6.06 | ... | 5.80 | 6.65 | 10.65††[5] | 6.00 | 6.25 | 7.55 |
| Buffalo (w'hse) | 5.60 | 6.40 | 8.09 | 5.86 | ... | 5.60 | 6.45 | 10.45††[5] | 5.80 | 6.05 | 7.35 |
| Pitts. (w'hse) | 5.60 | 6.40* | 7.75 | 5.65-5.95 | 6.90 | 5.55 | 6.40 | 10.10†† | 5.70 | 5.75 | 7.00 |
| Detroit (w'hse) | 5.45-5.78 | 6.53-6.80 | 7.99 | 5.94-5.95 | 7.75 | 5.84 | 6.56 | 8.91 | 6.09 | 6.19-6.35 | 7.28 |
| Cleveland (del.) | 5.80 | 6.60 | 8.30 | 5.89 | 7.10 | 5.77 | 6.60-6.70 | 8.91 | 10.02 | 6.12 | 7.32 |
| Cleve. (w'hse) | 5.60 | 6.40 | 8.10 | 5.69 | 6.90 | 5.57 | 6.40-6.50 | 8.71 | 5.82 | 5.92 | 7.12 |
| Cincin. (city) | 6.02 | 6.59 | 7.34 | 5.95 | ... | 5.95 | 6.51 | ... | 6.24 | 6.34 | 7.50 |
| Chicago (city) | 5.80 | 6.60 | 7.95 | 5.75 | ... | 5.75 | 6.50 | 10.30 | 5.90 | 6.00 | 7.20 |
| Chicago (w'hse) | 5.60 | 6.40 | 7.75 | 5.55 | ... | 5.55 | 6.30 | 10.10 | 5.70 | 5.80 | 7.00 |
| Milwaukee (city) | 5.94 | 6.74 | 8.09 | 5.89 | ... | 5.89 | 6.74 | 10.44 | 6.04 | 6.14 | 7.34 |
| Milwau. (c'try) | 5.74 | 6.54 | 7.89 | 5.69 | ... | 5.69 | 6.54 | 10.24 | 5.84 | 5.94 | 7.14 |
| St. Louis (del.) | 6.05 | 6.85 | 8.20 | 6.00 | ... | 6.00 | 6.85 | 10.55 | 6.23 | 6.33 | 7.53 |
| St. L. (w'hse) | 5.85 | 6.65 | 8.00 | 5.80 | ... | 5.80 | 6.65 | 10.35 | 6.03 | 6.13 | 7.33 |
| Kans. City (city) | 6.40 | 7.20 | 8.40 | 6.35 | | 6.35 | 7.20 | ... | 6.50 | 6.60 | 7.80 |
| KansCity (w'hse) | 6.20 | 7.00 | 8.20 | 6.15 | ... | 6.15 | 7.00 | | 6.30 | 6.40 | 7.60 |
| Birm'hm (city) | 5.75 | 6.55 | 6.90[2] | 5.70 | | 5.70 | 7.53 | ... | 5.85 | 6.10 | 8.25 |
| Birm'hm (w'hse) | 5.60 | 6.40 | 6.75[2] | 5.55 | ... | 5.55 | 7.53 | ... | 5.70 | 5.95 | 8.23 |
| Los Ang. (city) | 6.55 | 8.10 | 9.05[3] | 6.60 | 8.90 | 6.55 | 7.75 | ... | 6.55 | 6.60 | 9.20 |
| L. A. (w'hse) | 6.35 | 7.90 | 8.85[3] | 6.40 | 8.70 | 6.35 | 7.55 | ... | 6.35 | 6.40 | 8.70 |
| San Francisco | 6.65 | 7.80[4] | 8.90[3] | 6.60 | ... | 6.45 | 8.20 | ... | 6.45 | 6.50 | 8.60 |
| Seattle-Tacoma | 7.05 | 8.60[5] | 9.20[5] | 7.30 | ... | 6.75 | 9.10 | 11.15 | 6.65 | 6.75 | 8.80 |

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted; Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

## ORES

### Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

| | |
|---|---|
| Old range bessemer | $8.70 |
| Old range nonbessemer | 8.55 |
| Mesabi bessemer | 8.45 |
| Mesabi nonbessemer | 8.30 |
| High phosphorus | 8.30 |

### Eastern Local Ore

Cents per unit, del. E. Pa.

| | |
|---|---|
| Foundry and basic 56-62% concentrates contract | 17.00 |

### Foreign Ore

Cents per unit, c.i.f. Atlantic ports

| | |
|---|---|
| Swedish basic, 60 to 68%: | |
| Spot | 17.00 |
| Long-term contract | 15.00 |
| North African hematites | 15.75 |
| Brazilian iron ore, 68-69% | 18.00 |

### Tungsten Ore

Net ton unit, duty paid

| | |
|---|---|
| Foreign wolframite and scheelite, per net ton unit | $65.00 |
| Domestic scheelite, mines | 65.00 |

### Manganese Ore

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

### Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

| | |
|---|---|
| *Indian and African* | |
| 48% 2.8:1 | $32.50 |
| 48% 3:1 | 35.00-36.00 |
| 48% no ratio | 26.00 |
| *South African Transvaal* | |
| 41% no ratio | $27.00-28.00 |
| 48% no ratio | 34.00-35.00 |
| *Brazilian* | |
| 44% 2.5:1 lump | $32.00 |
| *Rhodesian* | |
| 45% no ratio | $20.00-21.00 |
| 48% no ratio | 26.00 |
| 48% 3:1 lump | 35.00-36.00 |
| Domestic—rail nearest seller | |
| 48% 3:1 | $39.00 |

### Molybdenum

| | |
|---|---|
| Sulphide concentrates per lb, molybdenum content, mines | $1.00 |

## MANGANESE ALLOYS

**Spiegeleisen:** (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

**Standard Ferromanganese:** (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., Welland, Ont., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

**Low-Carbon Ferromanganese, Regular Grade:** (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max, 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max, 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

**Medium-Carbon Ferromanganese:** (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

**Manganese metal,** 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

**Manganese Electrolytic:** 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

**Silicomanganese:** (Mn 65-68%). Contract, lump bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

## TITANIUM ALLOYS

**Ferrotitanium, Low-Carbon:** (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

**Ferrotitanium, High-Carbon:** (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Nigara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

**Ferrotitanium, Medium-Carbon:** (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

## OTHER FERROALLOYS

**Ferrocolumbium:** (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

**Ferrotantalum—Columbium:** (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

**Silcaz Alloy:** (Si 35-40%, Ca 9-11%, Al 6-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

**SMZ Alloy:** (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

**Graphidox No. 4:** (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

**V-5 Foundry Alloy:** (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

**Simanal:** (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

**Ferrophosphorus:** (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

**Ferromolybdenum:** (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

**Technical Molybdic-Oxide:** Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

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*Note: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 135, July 9 issue; calcium, zirconium and briquetted alloys, page 141, July 16. Refractories prices also were published on page 141, July 16 issue.*

# CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

## STEELMAKING SCRAP COMPOSITE

| | |
|---|---|
| July 19 | $44.00 |
| July 12 | 44.00 |
| June 1951 | 44.00 |
| July 1950 | 37.04 |
| July 1946 | 19.17 |

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

### No. 1 Heavy Melting Steel (Grade) 1

| Basing Point | Dealer, Industrial | Railroad |
|---|---|---|
| Alabama City, Ala. | $39.00 | $41.00 |
| Ashland, Ky. | 42.00 | 44.00 |
| Atlanta, Ga. | 39.00 | 41.00 |
| Bethlehem, Pa. | 42.00 | 44.00 |
| Birmingham, Ala. | 39.00 | 41.00 |
| Brackenridge, Pa. | 44.00 | 46.00 |
| Buffalo, N. Y. | 43.00 | 45.00 |
| Butler, Pa. | 44.00 | 46.00 |
| Canton, O. | 44.00 | 46.00 |
| Chicago, Ill. | 42.50 | 44.50 |
| Cincinnati, O. | 43.00 | 45.00 |
| Claymont, Del. | 42.50 | 44.50 |
| Cleveland, O. | 43.00 | 45.00 |
| Coatesville, Pa. | 42.50 | 44.50 |
| Conshohocken, Pa. | 42.50 | 44.50 |
| Detroit, Mich. | 41.15 | 43.15 |
| Duluth, Minn. | 40.00 | 42.00 |
| Harrisburg, Pa. | 42.50 | 44.50 |
| Houston, Tex. | 37.00 | 39.00 |
| Johnstown, Pa. | 44.00 | 46.00 |
| Kansas City, Mo. | 39.50 | 41.50 |
| Kokomo, Ind. | 42.00 | 44.00 |
| Los Angeles | 36.00 | 37.00 |
| Middletown, O. | 43.00 | 45.00 |
| Midland, Pa. | 44.00 | 46.00 |
| Minnequa, Colo. | 38.00 | 40.00 |
| Monessen, Pa. | 44.00 | 46.00 |
| Phoenixville, Pa. | 42.50 | 44.50 |
| Pittsburg, Calif. | 35.00 | 37.00 |
| Pittsburgh, Pa. | 44.00 | 46.00 |
| Portland, Oreg. | 35.00 | 37.00 |
| Portsmouth, O. | 42.00 | 44.00 |
| St. Louis, Mo. | 41.00 | 43.00 |
| San Francisco | 35.00 | 37.00 |
| Seattle, Wash. | 35.00 | 37.00 |
| Sharon, Pa. | 44.00 | 46.00 |
| Sparrows Point, Md. | 42.00 | 44.00 |
| Steubenville, O. | 44.00 | 46.00 |
| Warren, O. | 44.00 | 46.00 |
| Weirton, W. Va. | 44.00 | 46.00 |
| Youngstown, O. | 44.00 | 46.00 |

### Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

#### O H and Blast Furnace Grades

| | | |
|---|---|---|
| 2. | No. 2 Heavy Melting | −$2.00 |
| 3. | No. 1 Busheling | Base |
| 4. | No. 1 Bundles | Base |
| 5. | No. 2 Bundles | − 3.00 |
| 6. | Machine Shop Turnings | −10.00 |
| 7. | Mixed Borings & Short Turnings | − 6.00 |
| 8. | Shoveling Turnings | − 6.00 |
| 9. | No. 2 Busheling | − 4.00 |
| 10. | Cast Iron Borings | − 6.00 |

#### Elec. Furnace and Frdy. Grades

| | | |
|---|---|---|
| 11. | Billet, Bloom & Forge Crops | + 7.50 |
| 12. | Bar Crops & Plate | + 5.00 |
| 13. | Cast Steel | + 5.00 |
| 14. | Punchings & Plate Scrap | + 2.50 |
| 15. | Electric Furnace Bundles | + 2.00 |
| | Cut Structurals & Plate: | |
| 16. | 3 feet and under | + 3.00 |
| 17. | 2 feet and under | + 5.00 |
| 18. | 1 foot and under | + 6.00 |
| 19. | Briquetted Cast Iron Borings | Base |
| | Foundry, Steel: | |
| 20. | 2 feet and under | + 2.00 |
| 21. | 1 foot and under | + 4.00 |
| 22. | Springs and Crankshafts | + 1.00 |
| 23. | Alloy Free Turnings | − 3.00 |
| 24. | Heavy Turnings | − 1.00 |

#### Special Grades

| | | |
|---|---|---|
| 25. | Briquetted Turnings | Base |
| 26. | No. 1 Chemical Borings | − 3.00 |
| 27. | No. 2 Chemical Borings | − 4.00 |
| 28. | Wrought Iron | +10.00 |
| 29. | Shafting | +10.00 |

#### Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

#### Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings of scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

### Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

| | | |
|---|---|---|
| 2. | No. 2 Heavy Melting Steel | −$2.00 |
| 3. | No. 2 Steel Wheels | Base |
| 4. | Hollow Bored Axles and loco. axles with keyways between the wheelseats | Base |
| 5. | No. 1 Busheling | − 3.50 |
| 6. | No. 1 Turnings | − 3.00 |
| 7. | No. 2 Turnings, Drillings & Borings | −12.00 |
| 8. | No. 2 Cast Steel and uncut wheelcenters | − 6.00 |
| 9. | Uncut Frogs, switches | Base |
| 10. | Flues, Tubes & Pipes | − 8.00 |
| 11. | Structural, Wrought Iron and/or steel, uncut | − 6.00 |
| 12. | Destroyed Steel Cars | − 8.00 |
| 13. | No. 1 Sheet Scrap | − 9.50 |
| 14. | Scrap Rails, Random Lengths | + 2.00 |
| 15. | Rerolling Rails | + 7.00 |
| | Cut Rails: | |
| 16. | 3 feet and under | + 5.00 |
| 17. | 2 feet and under | + 6.00 |
| 18. | 18 inches and under | + 8.00 |
| 19. | Cast Steel, No. 1 | + 3.00 |
| 20. | Uncut Tires | + 2.00 |
| 21. | Cut Tires | + 5.00 |
| | Bolsters & Side Frames: | |
| 22. | Uncut | Base |
| 23. | Cut | + 3.00 |
| 24. | Angle, Splice Bars & Tie Plates | + 5.00 |
| 25. | Solid Steel Axles | +12.00 |
| 26. | Steel Wheels, No. 3 oversize | Base |
| 27. | Steel Wheels, No. 3 | + 5.00 |
| 28. | Spring Steel | + 5.00 |
| 29. | Couplers & Knuckles | + 5.00 |
| 30. | Wrought Iron | + 8.00 |
| 31. | Fireboxes | − 8.00 |
| 32. | Boilers | − 6.00 |
| 33. | No. 2 Sheet Scrap | −13.00 |
| 34. | Carsides, Doors, Car Ends, cut apart | − 6.00 |

#### Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceeed that for base grade (No. 1).

### CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

| | | |
|---|---|---|
| 1. | No. 1 (Cupola) | $49.00 |
| 2. | No. 2 (Charging Box) | 47.00 |
| 3. | No. 3 (Hvy. Breakable) | 45.00 |
| 4. | No. 4 (Burnt Cast) | 41.00 |
| 5. | Cast Iron Brake Shoes | 41.00 |
| 6. | Stove Plate | 46.00 |
| 7. | Clean Auto Cast | 52.00 |
| 8. | Unstripped Motor Blocks | 43.00 |
| 9. | Wheels, No. 1 | 47.00 |
| 10. | Malleable | 55.00 |
| 11. | Drop Broken Machinery | 52.00 |

#### Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

#### Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.

(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

(4) For preparing into Grade No. 25, $6.

(5) For preparing into Grade No. 19, $6

(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) For preparing into Grade No. 17 or Grade No. 21, $11.

(8) For preparing into Grade No. 18 or Grade No. 20, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intrasit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

(3) For preparing into Grade No. 16, $4.

(4) For preparing into Grade No. 17, $5.

(5) For preparing into Grade No. 18, $7.

(6) For preparing into Grade No. 21, $4.

(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

#### Commissions

No commissions shall be payable to a broker in excess of $1.

#### Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

#### Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

#### Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

### HAMILTON, ONT.

(Delivered Prices)

| | |
|---|---|
| Heavy Melt. | $35.00 |
| No. 1 Bundles | 35.00 |
| No. 2 Bundles | 34.00 |
| Mechanical Bundles | 33.00 |
| Mixed Steel Scrap | 31.00 |
| Mixed Borings, Turnings | 28.00 |
| Rails, Remelting | 35.00 |
| Rails, Rerolling | 38.00 |
| Busheling | 29.50 |
| Bushlings new factory, prep'd | 33.00 |
| Bushelings new factory, unprep'd | 28.00 |
| Short Steel Turnings | 28.00 |
| Cast Iron Grades* | |
| No. 1 Machinery Cast | 58.00-60.00 |

---

* F.o.b. shipping point.

**SCRAP** *at your Service!*

The facilities and experienced personnel in each of our offices, stand ready to supply your every scrap requirement whenever and wherever needed.

# LURIA BROTHERS AND COMPANY, INC.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

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LEBANON, PENNA.
READING, PENNA.
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MODENA, PENNA.
PITTSBURGH, PENNA.
ERIE, PENNA.

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BOSTON, MASS.
Statler Building

BUFFALO, N. Y.
Genesee Building

CHICAGO, ILLINOIS
100 W. Monroe St.

CLEVELAND, OHIO
1022 Midland Bldg.

DETROIT, MICHIGAN
2011 Book Building

HOUSTON, TEXAS
1114 Texas Av. Bldg.

LEBANON, PENNA.
Luria Building

NEW YORK, N. Y.
100 Park Avenue

PITTSBURGH, PA.
Oliver Building

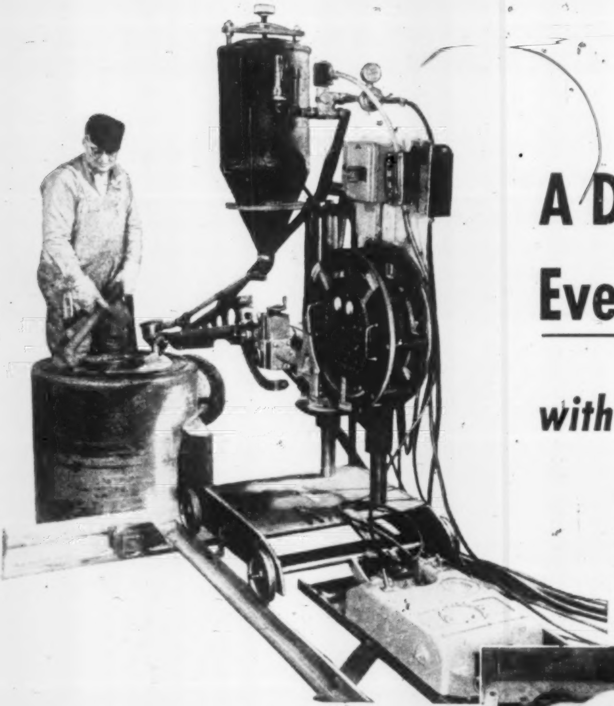
PUEBLO, COLORADO
334 Colorado Bldg.

READING, PENNA.
Luria Building

ST. LOUIS, MISSOURI
2052 Railway Exchange Bldg.

SAN FRANCISCO, CALIFORNIA
Pacific Gas & Elec. Co., Bldg.

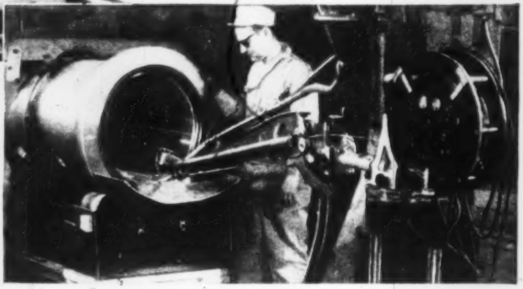
LEADERS IN IRON AND STEEL SCRAP SINCE 1889



# A Day's Output Every Hour

## with UNIONMELT Welding

Trade-Mark



(*Above*) UNIONMELT welding a chromium alloy end ring to a mild steel pump shell takes only 1 hour and 23 minutes. Former methods of welding took 10 hours. Ring and shell, each 1 in. thick, are joined in consecutive passes as the work rotates under the UNIONMELT welding head.

(*Right*) This UNIONMELT welding machine smoothly deposits a sound, corrosion-resistant overlay inside a mild steel pump shell. Stainless steel metal — 20 to 120 lb. of it, depending on pump size — builds up at 20 lb. per hour. Highest former rate was 2 lb. per hour.

In making high-pressure steam pumps, these two welding operations used to take 20 hours—2½ working days. This was cut to 2⅔ hours by UNIONMELT welding as shown above. In addition, finishing costs dropped sharply because the UNIONMELT deposits are smoother and need less machining.

High-speed production is common wherever automatic UNIONMELT welding is used to join ferrous or non-ferrous metals. Welds up to 3 in. thick can be made in one pass; light-gage sheet can be welded at speeds up to 200 in. per minute.

UNIONMELT welding is only one of many time- and moneysaving LINDE methods for making, cutting, joining, treating, and forming metals. So, whatever you do with metals, there is a good chance that LINDE know-how, show-how, and equipment can help you do it better, more quickly, or at lower cost. Telephone or write to our nearest office today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in Other Principal Cities. In Canada: Dominion Oxygen Company, Limited, Toronto.

*Unionmelt*
Trade-Mark

**EQUIPMENT AND SUPPLIES**
**for fast, automatic electric welding.**
**No sparks, spatter, smoke, or flash.**

The terms "Linde" and "Unionmelt" are registered trade-marks of Union Carbide and Carbon Corporation

# The Metal Market

**Full government allocation becomes effective Aug. 1 on copper and zinc; probably Sept. 1 on lead. Requirements for defense needs soar while flow of new supplies lags**

RELIEF from nonferrous metal shortages is not in sight. While demand for vital military programs is rising rapidly, suppliers are unable to increase the supply materially. As a matter of fact, supplies are being reduced as a result of scattered labor disturbances and shrinking imports. To promote the equitable distribution of supplies, National Production Authority ordered complete allocation of zinc and copper and will take similar action on lead by Sept. 1.

Copper allocation was ordered, NPA said, to assure that mills will produce copper controlled materials that meet military and defense-supporting demands as programmed under CMP. Amended order M-16 gives NPA complete authority to allocate refined copper, brass mill scrap, copper-base alloy scrap, unalloyed copper scrap, fired and demilitarized cartridge and artillery casings, copper and copper-base alloy ingot, copper and copper-base alloy shot and waffle, and copper precipitate.

Strikes in Anaconda Smelting & Refining Co. Utah plants, along with strikes in other domestic and Chilean properties, have cut supplies of raw copper substantially. In addition, the Chilean selling price is 3 cents a pound over the domestic price ceiling and the government has not secured congressional approval to subsidize the difference so that this import supply source can be tapped.

New inventory restrictions also go into effect Aug. 1. Anyone who generates scrap through fabrication, manufacture, or obsolescence is limited to 30 days' accumulation unless it is less than 2000 pounds. The limit on scrap dealers is anything in excess of the weight of his total deliveries of scrap, based on copper content, in the preceding 60 days.

The order also requires all producers and distributors of copper materials to file by Aug. 10 an application for September quotas. This pattern will continue in succeeding months. It also restricts toll agreements by extending the present requirement for written NPA approval to all segments of the copper industry, effective July 15.

Refiners and scrap dealers and brokers can receive specified types of copper material without allocation as long as they stay within their inventory requirements. This does not apply to jobbers, exporters, scrap generators, brass mills, copper wire mills, ingot makers, brass and bronze foundries, or miscellaneous producers.

NPA said the order "will be particularly beneficial to certain small producers who have been deprived of their normal sources of supply due to defense needs . . . . The regulation will assure allocations to such producers to permit them to produce at economical rates."

Stocks of refined copper held steady at 60,912 tons at the end of June as deliveries to fabricators dropped to 114,103 tons from 118,113 tons in May while refined copper production eased to 105,127 tons from 113,513. Production of blister copper was lower in June at 79,884 tons compared with 89,609 tons in May.

ALUMINUM GOES UNDER: Alcoa aluminum is now being used by the Navy for submarine fairwaters—the aluminum shell topside that houses conning tower, radar equipment, air intakes and exhaust. Result is clean appearance and low resistance to forward motion. Other undersea uses for aluminum: Bulkheads, lockers, gratings, insulating sheathing and pipe bunks

Lead sellers have resumed booking of orders for August delivery on the basis of the provisions regulating distribution in NPA order M-38. No improvement is noted in lead supply. Output from domestic mines totaled 34,201 net tons in May, a 2 per cent increase over the April production of 33,487 tons, reports the Bureau of Mines. The increased production was attributable to the longer working period in the month. The average daily rate of output was 1 per cent below the April level.

The switch from producer-controlled allotments of metals to government allocations may result in hardship for some users. Many users are on a hand-to-mouth basis and any undue delay in receipt of allocations may force them to suspend operations.

RFC continues to quote Straits tin at $1.06 a pound, although the Singapore equivalent is somewhat lower. A substantial tonnage of tin has been accumulated in Chile and will be shipped as soon as terms of a new contract with the United States government are agreed upon.

## New Indria Mining Mercury

**San Francisco**—Shutdown for more than a year, New Indria mercury mine, 70 miles southeast of Hollister, northern California, once more has been readied for production. During World War II, the mine produced 25,000 flasks of mercury. C. Hyde Lewis, president, New Indria Mining & Chemical Co., which operates the diggings, said 40 workers are at the mine and furnaces. Ore should be ready for shipment by Aug. 1.

## Achieves Nickel Output Goal

**Toronto, Ont.**—International Nickel Co. of Canada Ltd. has increased production by 1 million pounds of refined nickel monthly, to bring current production to 21 million pounds a month, R. L. Beattie, vice president and general manager, announced. Originally it was planned to have the increased rate go into effect at the yearend, thus it has been accomplished almost six months ahead of schedule. This was made possible by the installation of emergency facilities at the various Canadian plants and by the acceleration of a major program of expansion of underground mining capacity, accompanied by changes in the metallurgical process.

Defense requirements of western nations, augmented by heavy civilian requirements, have created an abnormal overall demand for nickel which is taxing Inco.'s production facilities to the limit. This comes at a time when the company is in the midst of a large program of conversion from the mining of ore both from surface and underground to mining exclusively of underground ore.

## Aluminum Output Gains

**New York**—Primary aluminum production in the United States during May showed little change from April's total, says Donald M. White, Secretary, Aluminum Association, this city. The May total of 135,440,954 pounds was only slightly above the 135,402,337 produced in April.

Aluminum sheet and plate shipped by members of the Association's Sheet Division in May totaled 90,855,584 pounds, or about 3 per cent less than the 93,963,648 pounds shipped in the previous month. Foil shipments by member companies during May were 8,357,750 pounds, as against 9,262,781 pounds for the preceding month.

Members of the Association's Foundry Division shipped 3,360,648 pounds of permanent-mold-rough castings (except pistons), as compared with 3,252,146 pounds shipped in April. The dollar value for these May shipments was $1,986,859, whereas the April dollar value was $1,910,063.

# NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

## Primary Metals

**Copper:** Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

**Brass Ingots:** 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

**Zinc:** Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

**Lead:** Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

**Primary Aluminum:** 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

**Secondary Aluminum:** Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

**Magnesium:** Commercially pure (99.8%) standard ingots 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

**Tin:** Grade A, prompt 106.00.

**Antimony:** American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

**Nickel:** Electrolytic cathodes, 99.9%, base sizes at refinery unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

**Mercury:** Open market, spot, large lots, New York, $210-213 per 76-lb flask.

**Beryllium-Copper:** 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

**Cadmium:** "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

**Cobalt:** 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

**Gold:** U. S. Treasury, $35 per ounce.

**Silver:** Open market, New York 90.16c per oz.

**Platinum:** $90-93 per ounce from refineries.

**Palladium:** $24 per troy ounce.

**Iridium:** $200 per troy ounce.

**Titanium (sponge form):** $5 per pound.

## Rolled, Drawn, Extruded Products

### COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; effective May 23, 1951)

**Sheet:** Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18; 90% 39.78; red brass, 85% 38.86; 80% 38.47; best quality, 38.07; nickel silver, 18%, 50.99; phosphor-bronze grade A, 5%, 59.42.

**Rod:** Copper, hot-rolled 36.03; cold-drawn 37.28; yellow brass free cutting, 31.70; commercial bronze, 95%, 39.87; 90%, 39.47; red brass 85%, 38.55; 80%, 38.16.

**Seamless Tubing:** Copper 40.22; yellow brass 40.29; commercial bronze, 90%, 42.44; red brass, 85% 41.77.

**Wire:** Yellow brass 37.57; commercial bronze, 95%, 40.47; 90%, 40.07; red brass, 85%, 39.15; 80%, 38.76; best quality brass, 38.36.

**Copper Wire:** Bare, soft, f.o.b. eastern mills c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10; l.c.l. 30.18; 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50; l.c.l. 35.25.

### ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

**Sheets and Circles:** 2S and 3S mill finish c.l.

| Thickness Range Inches | Widths or Diameters, In., Inc. | Flat Sheet Base* | Coiled Sheet Base | Coiled Sheet Circle† Base |
|---|---|---|---|---|
| 0.249-0.136 | 12-48 | 30.1 | ... | ... |
| 0.135-0.096 | 12-48 | 30.6 | ... | ... |
| 0.095-0.077 | 12-48 | 31.2 | 29.1 | 33.2 |
| 0.076-0.061 | 12-48 | 31.8 | 29.3 | 33.4 |
| 0.060-0.048 | 12-48 | 32.1 | 29.5 | 33.7 |
| 0.047-0.038 | 12-48 | 32.5 | 29.8 | 34.0 |
| 0.037-0.030 | 12-48 | 32.9 | 30.2 | 34.6 |
| 0.029-0.024 | 12-48 | [illegible] | 30.5 | 35.0 |
| 0.023-0.019 | 12-36 | [illegible] | 31.1 | 35.7 |
| 0.018-0.017 | 12-36 | 34.7 | 31.7 | 36.6 |
| 0.016-0.015 | 12-36 | 35.5 | 32.4 | 37.6 |
| 0.014 | 12-24 | 36.5 | 33.3 | 38.9 |
| 0.013-0.012 | 12-24 | 37.4 | 34.0 | 39.7 |
| 0.011 | 12-24 | 38.4 | 35.0 | 41.2 |
| 0.010-0.0095 | 12-24 | 39.4 | 36.1 | 42.7 |
| 0.009-0.0085 | 12-24 | 40.6 | 37.2 | 44.4 |
| 0.008-0.0075 | 12-24 | 41.9 | 38.4 | 46.1 |
| 0.007 | 12-18 | 43.3 | 39.7 | 48.2 |
| 0.006 | 12-18 | 44.8 | 41.0 | [illegible] |

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* Lengths 72 to 180 inches. † Miximum diameter, 26 inches.

**Screw Machine Stock:** 5000 lb and over.

| Diam. (in.) or distance across flats | —Round— R317-T4, 17S-T4 | —Hexagonal— R317-T4 | 17S-T4 |
|---|---|---|---|
| 0.125 | 52.0 | .... | .... |
| 0.156-0.188 | 44.0 | .... | .... |
| 0.219-0.313 | 41.5 | .... | .... |
| 0.375 | 40.0 | 46.0 | 48.0 |
| 0.406 | 40.0 | .... | .... |
| 0.438 | 40.0 | 46.0 | 48.0 |
| 0.469 | 40.0 | .... | .... |
| 0.500 | 40.0 | 46.0 | 48.0 |
| 0.531 | 40.0 | .... | .... |
| 0.563 | 40.0 | .... | 45.0 |
| 0.594 | 40.0 | .... | .... |
| 0.625 | 40.0 | 43.5 | 45.0 |
| 0.688 | 40.0 | .... | 45.0 |
| 0.750-1.000 | 39.0 | 41.0 | 42.5 |
| 1.063 | 39.0 | .... | 41.0 |
| 1.125-1.500 | 37.5 | 39.5 | 41.0 |
| 1.563 | 37.0 | .... | .... |
| 1.625 | 36.5 | .... | 39.5 |
| 1.688-2.000 | 36.5 | .... | .... |

### LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

### ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 22.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

### "A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

### MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

### MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

### TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

## Plating Materials

**Chromic Acid:** 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

**Copper Anodes:** Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

**Copper Cyanide:** 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

**Sodium Cyanide:** 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

**Copper Carbonate:** 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

**Nickel Anodes:** Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

**Nickel Chloride:** 100-lb kegs, 35.00c; 400-lb bbl. 33.00c; up 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

**Sodium Stannate:** 25 lb cans only, less than 100 lb, to consumers 79.20c; 100 or 350 lb drums only, 100 to 600 lb, 64.50c; 700 to 1900 lb, 62.00c; 2000 to 9900 lb, 60.20c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

## Scrap Metals

### Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

| | Clean Heavy | Rod Ends | Clean Turnings |
|---|---|---|---|
| Copper | 21.50 | 21.50 | 20.75 |
| Yellow Brass | 19.125 | 18.875 | 17.875 |
| Commercial Bronze | | | |
| 95% | 20.50 | 20.25 | 19.75 |
| 90% | 20.50 | 20.25 | 19.75 |
| Red Brass | | | |
| 85% | 20.25 | 20.00 | 19.375 |
| 80% | 20.125 | 19.875 | 19.375 |
| Muntz metal | 18.125 | 17.875 | 17.375 |
| Nickel silver, 10% | 21.50 | 21.25 | 10.75 |
| Phos. bronze, A | 27.00 | 26.75 | 25.75 |

### Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

### Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

### Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c, in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

### Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

## DAILY PRICE RECORD

| 1951 | Copper | Lead | Zinc | Tin | Aluminum | Antimony | Nickel | Silver |
|---|---|---|---|---|---|---|---|---|
| July 2-19 | 24.50 | 16.80 | 17.50 | 106.00 | 19.00 | 42.00 | 56.50 | 90.16 |
| June 28-30 | 24.50 | 16.80 | 17.50 | 106.00 | 19.00 | 42.00 | 56.50 | 90.16 |
| June 18-27 | 24.50 | 16.80 | 17.50 | 106.00 | 19.00 | 42.00 | 56.50 | 87.75 |
| June 15-16 | 24.50 | 16.80 | 17.50 | 111.00 | 19.00 | 42.00 | 56.50 | 87.75 |
| June 14 | 24.50 | 16.80 | 17.50 | 118.00 | 19.00 | 42.00 | 56.50 | 87.75 |
| June 13 | 24.50 | 16.80 | 17.50 | 123.00 | 19.00 | 42.00 | 56.60 | 87.75 |
| June 8-12 | 24.50 | 16.80 | 17.50 | 129.00 | 19.00 | 42.00 | 56.50 | 87.75 |
| June 7 | 24.50 | 16.80 | 17.50 | 136.00 | 19.00 | 42.00 | 56.50 | 87.75 |
| June 1-6 | 24.50 | 16.80 | 17.50 | 136.00 | 19.00 | 42.00 | 56.50 | 90.16 |
| June Avg. | 24.50 | 16.80 | 17.50 | 117.962 | 19.00 | 42.00 | 56.50 | 88.492 |
| May Avg. | 24.50 | 16.80 | 17.50 | 139.923 | 19.00 | 42.00 | 50.50 | 90.16 |
| Apr. Avg. | 24.50 | 16.80 | 17.50 | 145.735 | 19.00 | 42.00 | 50.50 | 90.16 |

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime west, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel electrolytic cathodes, 99.9%, base sizes at refineery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

## Sheets, Strip . . .

Sheet and Strip Prices, Page 109 & 110

**Boston**—Heavy orders for fourth quarter delivery under CMP are centered mainly for October and November flat-rolled schedules. With space lacking for late-processed September volume and with producers booked to set-aside limits, scheduling for fourth quarter will be difficult with readjustments likely. For October, only CMP orders are firmly booked.

Allocations for listed "B" products assign more tonnage to most individual consumers. Delays in getting total allocations to consumers for September and, in some instances, sluggishness and faulty procedure on the part of the user, complicate clarification for scheduling.

**New York**—Complicating the scheduling of September sheet production, in addition to the reduction in the lead time, are further increases in the amount of quotas the mills must set aside for that month on some grades. Percentage increases on hot and cold-rolled alloy sheets are established at 75 per cent of production; high grade electrical sheets, at 95 per cent, the same as on low and medium grade electrical sheets. Some sheet sellers will be unable to accurately ascertain their position for September for another several days.

**Philadelphia**—Reflecting cutbacks in some major durable consumer lines, without a corresponding pick-up in defense activity, sheet mills are able to work in a little free tonnage, especially in cold-finished grades. One large producer has such tonnage available and expects to have increasing amounts available throughout the remainder of this quarter.

**Pittsburgh** — September rolling schedules are set. Although only 70 per cent production of hot-rolled sheet is required for defense, more than 95 per cent will follow that channel. Civilian market will not be much affected since this same condition pervailed before CMP. Minimum 54 per cent of cold-rolled production is for defense, but actual tonnage will be about 80 per cent. Producers estimate that 95 per cent overall production goes to defense in September; slightest tightening by NPA will automatically put closed-end plan in operation.

**Cincinnati**—Sheet mills are pushing production in an effort to get out maximum tonnage to reduce carry-overs on unrated orders. Meanwhile, pressure for September deliveries grows while a pinch in free tonnage becomes aggravated. A wide gap appears between supply and demand of hot-rolled material and most specialties.

**Chicago**—A sheetmaker's books for hot-rolled, cold-rolled and galvanized sheets are filled to the limit of set-asides for September, October and November. It is probable that December also could be filled. For September the avalanche of CMP certified requests was so great that considerable tonnage could not be accommodated and was turned back.

**Birmingham**—Sheet and strip, in scarce supply here for years, is even tighter now since 95 per cent of production is under government directive. Strip production has been stepped up somewhat because of the approaching cotton bailing season.

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## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 109

**Chicago** — Producers of billet steel reinforcing bars are sold out for balance of the year starting with September under the essential use set-aside limitation of 70 per cent.

**Los Angeles**—Rising tide of military and naval construction keeps demand for plain material brisk. Valuation of military and naval construction in southern California in June reached $24 million, 814 per cent higher than in May.

## Steel Bars . . .

Bar Prices, Page 109

**Chicago**—Some hot-rolled bar consumers stand to suffer from the extremely tight situation which has developed in this product. The 78 per cent set-aside for essential use actually is a cutback compared with the former 45 per cent for DO's plus defense-support directives. Barmakers' books for September thereby were more than filled with CMP certifications, making it necessary to take out last orders in. Farm equipment industry was last in because Washington was late in validating its requested requirements. Since some mills make bars on a two-month roll-cycle, NPA is being asked to approve scheduling on September-October basis. If this is permitted, most of present excess can be handled; otherwise, September excess will be handed back. Rail steel bars for September are oversold and farm machinery likely will feel brunt.

**New York**—Some leading carbon bar producers received more rated tonnage for September than they can possibly handle, with the prospect that a certain portion must be carried over into the fourth quarter. Situation has been made tighter in alloy bars by the increases in the percentage of set-asides for that month to 85 per cent for hot-rolled and to 75 per cent for cold finished. These reserves are predicated on production being not less than the average for April and May of this year and include directives as well as DO rated orders.

Reference in the government order increasing these set-asides is also made to ensuing months as well as September. It is almost certain, however, that beginning with the fourth quarter all steel will be placed under allocation.

**Boston**—Inability to obtain some alloying metal, notably nickel for approved melt schedules handicaps most producers in meeting alloy bar commitments. Limited "free" tonnage in carbon bars for September will be taken up by carryovers with producers having an open-end volume. Allocations to cold-finished bar converters in September will apply to October distribution. A few users failed to revalidate O orders, lacking knowledge of procedure. Some mills dropped this tonnage for September.

**Philadelphia**—Bar producers will require another week to get fully squared around on September schedules. The lead time has elapsed, but they still cannot advise customers fully as to what they will be able to supply in that month. They hold out little hope for non-rated customers. Producers report receipt of many CMP orders from other than their regular trade and, apart from trying to discourage these buyers, are able to do little about it.

**Pittsburgh**—July and August defense shipments of hot-rolled bars will exceed September's specified minimum set-aside of 78 per cent, since most producers are pushing production to erase overdue shipments. Around 90 per cent of September production is expected to find its way into defense effort.

**Seattle**—Rolling mill production in this area is again at peak, Northwest Steel Rolling Mills Inc. having resumed rolling on a five-day two-shift basis. Current backlogs will carry well into 1952. Some capacity is reserved for emergency public works.

## Tin Plate . . .

**Tin Plate Prices, Page 110**

**Chicago**—September schedules for tin mill products are fully filled up to the 95 per cent set-aside for essential use. Fourth quarter certifications have not yet been released by NPA.

**San Francisco**—Part of a $1,910,000 order for 76,554,000 cans for combat rations from the Army Quartermasters Corps will be filled by American Can Co.'s Oakland, Calif. plant. The company will complete the order at its Fairport, N. Y., and Maywood, Ill. plants. Deliveries will be completed by about Aug. 20.

## Plates . . .

**Plate Prices, Page 109**

**Philadelphia**—Most plate producers do not know precisely where they stand with regard to September schedules, but are sure of one thing: They have more rated work than they can produce. All producers figure on some carryover from August and this, combined with set-asides amounting to about 95 per cent, will aggregate more than they can handle. "Free" tonnage appears completely out of the picture.

Alan Wood Steel Co., Conshohocken, Pa., resumed production on its 84-inch mill July 17 after a suspension since the first of the month for repairs. This was several days earlier than originally scheduled.

**Pittsburgh**—Plate production is entirely under CMP control, defense requirements being submitted by directive only. Such a condition could lead to government requests for perhaps 110 per cent production which would cause continuous-mill plate production to throw product mix out of balance with resultant costly inefficiency in mill operation. Demand pressure for light plates is especially high with no civilian tonnage available for September.

**Birmingham**—Plate users are asking for tonnage which they know will not be forthcoming. With such a preponderance of production under control, mills continually explain: "No directive, no plates."

**Seattle**—Considerable plate tonnage is involved in several classified projects in this area, handled by U. S. engineers. Several other sizeable plate jobs are pending.

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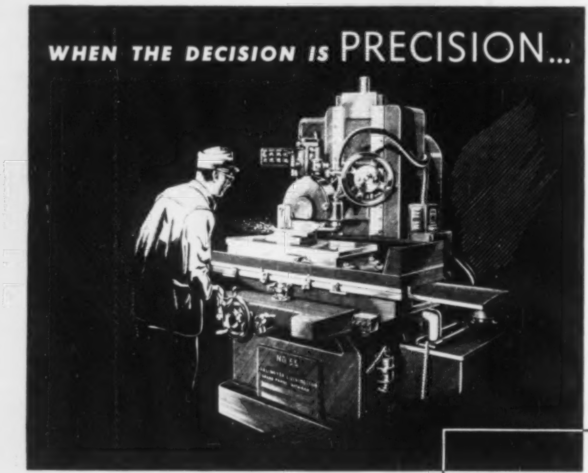
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## Semifinished Steel . . .

Semifinished Prices, Page 109

**San Francisco**—Bethlehem Pacific Coast Steel Corp.'s South San Francisco plant produced 24,523 tons of molten steel in June, a new monthly high mark and comparing with rated ingot capacity of 20,000 tons. This was the third time in the last eight months the mill has established an all-time record.

## Structural Shapes . . .

Structural Shape Prices, Page 109

**New York**—Structural orders are relatively few. While considerable work is under discussion, few inquiries are active. Inquiry may be expedited by CMP-4C, recently announced by NPA. It will serve both as a construction application and as an application for the allotment of controlled materials. The form replaces NPAF-24. Those having applications pending on this latter form should fill out the new form. Applications for fourth quarter allotments under form CMP-4G were due July 20.

**Boston** — Demand for structural steel for fourth quarter, estimated at nearly 100 per cent over estimated production, is punctuated by a wave of applications for allotments from third quarter carryovers. Many found no space open before fourth quarter. Demand for structurals is so heavy, shortage is expected to extend well into next year.

**Philadelphia** — Structural fabricators have given up hope of handling much of the non-rated tonnage on their books. This means the elimination of several months' work in some instances; out-and-out cancellations in a few. Some of the larger shops have about six months' rated work on hand.

**Pittsburgh** — September production of structurals is directed to defense effort at 90 per cent minimum rate. However, due to heavy industrial construction here entire output will be earmarked and civilian structural market will get no tonnage. Fabricators avoid any unrated work. Light structurals are in greatest demand.

**Chicago**—Shape mills are booked solidly for September through November and have only small openings for December. Fabricators are included in the September schedules but, being "A" producers, have not been given allotments for fourth quarter. Because of this, accommodation in last three months is going to be tough.

**Birmingham**—Even with construction considerably below anticipated volume, sufficient general work, including highways and bridges, together with an assortment of commercial buildings holds shape demand somewhat beyond ability of producers to meet.

**Los Angeles**—With shape producer's books filled through September, fabricators refer third and fourth quarter structural requirements to government allotting agencies.

**Seattle** — Fabricators have well rounded backlogs, deliveries on new contracts spaced into next March. Considerable tonnage is pending. Supplies continue tight, especially wide flange and some other items.

## Tubular Goods . . .

Tubular Goods Prices, Page 113

**Seattle**—Cast iron pipe market is slow, because agencies cannot compete in delivery with producers of other types. Warehouse stocks are slow.

## Stainless Steel . . .

Stainless Steel Prices, Page 113

**Beaver Falls, Pa.**—Price increases on seamless and welded austenitic stainless steel tubing and other tubular products containing nickel in excess of 5 per cent were announced by Babcock & Wilcox Tube Co., effective July 16. The increases are in accord with OPS supplementary regulation No. 33 to the General Price Regulation.

Producers of other products containing more than 5 per cent nickel have adjusted or are adjusting their price schedules.

## Wire . . .

Wire Prices, Page 111

**Boston** — Allocations for heading wire are heavier than available capacity for September and late procurement procedure under CMP has forced most producers to spread potential production. Increased set-asides on rods and finished carbon wire place better than 90 per cent of wire output under controls. Within this framework, CMP allocations are liberal, notably to consumers taking 100 tons or less quarterly; some in this category are down for more wire than formerly. Not so well off are users of imported rods. This tonnage counts in inventory limitations and cuts into CMP allotments.

**New York** — Producers of valve springs and other automotive wire requirements have not received cutbacks as a result of curtailed operations at consumers' plants but expect them by the end of this month. Meanwhile, demand for most specialties and standard manufacturing grades is active. Production is hampered by a shortage of rods.

**Birmingham** — Demand for most wire products exceeds supplies. Excessively hot weather slowed down agricultural demand, but other sources quickly took up the momentary slack.

**Los Angeles**—Demand for high carbon spring wire products lags. Bedspring and automotive wire requirements are depressed. One automaker, on reduced production schedules, refused July, Aug., and Sept. wire allocations.

## Iron Ore . . .

Iron Ore Prices, Page 115

**Cleveland** — Consumption of Lake Superior iron ore eased to 7,499,475 tons in June from 7,761,173 tons in May, reports Lake Superior Iron Ore Association from its new offices at 1400 Hanna Bldg., this city. Consumption for the first six months came to 43,629,328 tons compared with 39,845,999 tons in the like 1950 period. Stocks on hand at furnaces and Lake Erie docks July 1 amounted to 26,422,643 tons compared with 19,771,719 tons June 1 and 19,189,363 tons on July 1, 1950. There were 191 furnaces in blast on July 1 against 189 June 1 and 178 July 1 last year.

Shipments for the season to 7 a.m., July 16, amounted to 38,624,458 tons compared with 27,777,923 tons for the like period a year ago.

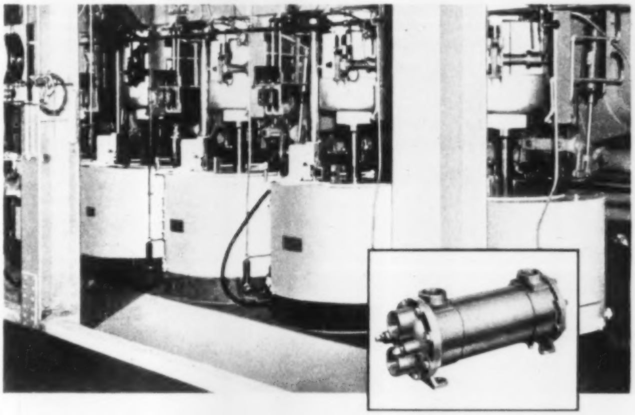
## Tungsten Ore . . .

**San Francisco**—Bradley Mining Co. has been given Defense Minerals Administration financial assistance in exploration of tungsten deposits in Lemhi county, Idaho. The Bradley firm is planning to spend several hundred thousand dollars in developing this and other of its tungsten properties in Idaho.

## Pig Iron . . .

Pig Iron Prices, Page 108

**Pittsburgh**—CMP will dominate 20 per cent of the September pig iron production; estimates that 90 per cent of the production will go for defense are not uncommon here. Merchant iron producers are swamped with rated and non-rated orders with the latter covered as equitably as possible. Adjustments in steelmaking practice by increasing iron charge to compensate for limited scrap supplies are reflected in heavier pig iron demand. Two district stacks are down for repairs and are not expected to resume operation until early September. Any decrease in iron de-



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mand because of summer slowdown is overshadowed by attempts to build inventories and by increased ratio of iron in melts.

**Boston**—Except for scattered carlots, bulk of foundry iron is being supplied by the Everett, Mass., furnace at higher prices. Supply of silvery pig iron is notably short. Melts in some cases are down to 15 per cent iron, although ranging up to 40 per cent in the case of builders of textile mill equipment. Foundry melt mixtures are more flexible with better metallurgical results following longer experience in iron-scrap ratios, although rejections are still a major cost factor with some shops.

**New York**—Pressure for pig iron is somewhat easier this month due to seasonal factors and may continue through August. However, there is demand for all domestic tonnage available. Foreign iron is not in such heavy demand because of high prices and uncertainties as to delivery and specifications. This lag of interest has had the effect of softening quotations on imported iron, but prices are still not attractive.

**Buffalo** — District pig iron operations climbed back to 100 per cent of capacity when a leading merchant iron seller relighted an idle stack which had been down for relining. However, production is expected to dip shortly as another furnace, which has been in action for about six years, may go down for extensive rehabilitation work. DO work continues to expand. Tightness grips the market, although holiday periods are in effect at many plants.

**Philadelphia**—The smaller of the two blast furnaces at Swedeland, Pa., is expected back in operation within another week or so after having been down this month for repairs. However, its production of foundry iron is not expected to be up to normal in August due to requirements of its affiliated steel mill for basic iron. A district steel plant purchased a fair sized tonnage of Spanish iron for shipment over next few weeks.

## Warehouse . . .

**Warehouse Prices, Page 115**

**New York**—While there is a seasonal lull in demand, there is still far more inquiry for warehouse steel than can be filled. Virtually all products are in tight supply. Heavy structurals are almost impossible to obtain out of warehouse at this time. Distributors prefer the lighter shapes as they can meet a greater diversity of demand and, thus, specify accordingly.

**Philadelphia**—Of the major products, pressure for sheets is lightest, distributors say. Even so, they would have no difficulty in selling all in stock were they disposed to do so. Bars, small shapes and plates are in heavy demand, although pressure is not quite as strong as it was earlier in the year due to seasonal conditions.

**Pittsburgh**—Receipts by distributors are on the 85 per cent minimum level. Demand pressure on warehouses does not allow any inventory-building and results in use of existing inventories to satisfy customers. Distribu-

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tors entertain little hope for relief even under closed-end CMP. No easing of demand due to normal summer slowdown is observed here. Bars are in scarcest supply with flat-rolled products nearly as tight. Alloy products also are in critical supply.

**Cincinnati**—Sales of building steel by warehouses are being maintained to the limit of supplies, as construction operations are well maintained. Inventories are inadequate to meet any increase in military requirements.

**Los Angeles**—Heavier volume of defense work boosted distributors' bookings of rated orders to 16-18 per cent from 8-10 per cent of total shipments in first quarter. Warehouse activity is steady at the June level.

**Seattle** — Warehouse steel demand continues steady. Were it not for shortages, the volume of turnover would be much greater. Distributors pay tribute to Coast producers who are making good deliveries. Expanded facilities of western mills is reflected in larger production in this area. Eastern mills show better delivery, but they are still behind on some schedules.

## Scrap . . .

Scrap Prices, Page 116

**Detroit**—With more weight thrown behind scrap collection by the newly formed scrap mobilization committee, dealers are hopeful their yards can recover to more nearly normal level of operations. No evidence of scrap hoarding is noted and the shortage is attribued solely to lower generation and high consumption. One mill, which was successful in stockpiling, has had its inventory reduced by NPA to a level more compatible with that of other mills of comparable size.

**Pittsburgh**—Scrap movement remains unchanged at a rather slow pace. Sources of scrap are being eliminated by terrific demand but condition is not reflected in greater scrap movement. All railroad scrap and some yard scrap is allocated; bulk of industrial scrap, particularly from major manufacturers, is earmarked.

**Boston**—Demand for cast scrap has slackened following relatively high shipments. At the same time, consumers are more strict on specifications. Steel scrap continues in limited supply with some consumers' inventories down to less than two weeks. Allocations of yard scrap has been limited. Most dealers could use more light material for presses, while receipts of heavy scrap are disappointing. Higher barge rate price at Providence, R. I., and southern New England puts other areas to the north at a disadvantage, although some buying is reported here at prices based on water shipment.

**New York**—Cast scrap grades are in easier supply with demand seasonally lighter. Steel scrap demand shows no easing whatsoever, the mills in eastern Pennsylvania and Pittsburgh pressing for tonnage as hard as ever.

**Buffalo**—Mills' scrap stocks are at seriously low levels and operations are threatened if reserve stocks are not replenished. It is doubtful whether any appreciable amount of obsolete scrap is dormant in this area. The Chamber of Commerce formed a scrap

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salvage committee months ago to bring out such scrap. Mills have been able to add slightly to reserve supplies during the past week as a result of increased allocations of material into the area from outside points. A minor pickup was noted also in supplies locally. Boat receipts, via the lakes and canal, have helped with approximately 100,000 tons arriving since the start of the navigation season.

**Philadelphia**—Steel scrap consumers report a further slight shrinkage in inventories and are hoping to keep ahead sufficiently to sustain operations until seasonal conditions for the collection of scrap become more favorable.

**Cleveland**—Possibility of peace in Korea has eased tension in the scrap market, although mills remain in dire need for heavier shipments. All railroad and most industrial grades are being allocated for immediate consumption. No stockpiling is possible during the present shortage. Walter L. Seelbach, president, Superior Foundry Inc., is chairman of a scrap mobilization committee organized by Cleveland Chamber of Commerce. Cleve H. Pomeroy, president, National Malleable & Steel Castings Co., is vice chairman.

**Chicago**—In view of the capacity consuming rate, mills are able to do no better than hold inventories. Fear of winter shortages grows. Stocks at Gary and South Works of United States Steel Co. remain at 6 and 9 days, respectively. About two weeks is average for other plants in this district. Foundry demand for cast grades is seasonably slower. There is little interest in building up stocks, suggesting a very tight situation this fall.

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**Birmingham**—Scrap users are becoming more selective as far as the various cast grades are concerned. The situation in steel scrap is exceptionally tight.

**Los Angeles** — Steelmaking scrap requirements up 170 per cent, coupled with lowest historical levels of scrap generation and collections, keep West Coast steel mills' scrap stocks down to 2-4 weeks' supply.

**San Francisco**—Consumers anxiously await results of general scrap mobilization drive as normal channels of supply are not coming up to the melt and some companies continue to go into inventories. Supplies on hand generally are around a two month's level. Top executives of industrial companies are receiving letters from the mobilization committee, stressing the need for releasing scrap. Traditionally, the coast has its smallest shipments of scrap steel and iron during the present season as 90 per cent is hauled by trucks, currently engaged in moving produce and field crops to the market.

**Seattle**—Receipts of steel scrap are steady at a higher level than earlier in the year. Dry weather and attractive prices have stimulated collection in the interior. Mill buyers are scouting all possible sources of supply. Conditions have stimulated shipments from Alaska. This is excellent material including stamp mills, dredges, buckets and other items from the mining industry. Regulations permit higher prices for scrap from offshore points because of higher delivered costs. Quality of local scrap is deteriorating and production results are unsatisfactory. Inventories are not rising and buyers anticipate the coming cold season with some anxiety.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

18,000 tons, transmission towers, Bureau of Reclamation, specification DS-3391, Mitchell, S. Dak., to American Bridge Co., Pittsburgh.

12,000 tons, forge-press building, Wyman-Gordon Co., North Grafton, Mass., to Bethlehem Steel Co.; Gilbane Building Corp., Providence, general contractor.

2040 tons, generating plant, Iowa-Southern Utilities Co., Eddysville, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

700 tons, transmission towers, Bureau of Reclamation, specification DS-3392, Mitchell, S. Dak., to Bethlehem Steel Co.

650 tons, Reading Railroad bridge, Reading, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

650 tons, office building, The Texas Co., New Orleans, to Steel Construction Co. Inc., Birmingham; Haase Construction Co., New Orleans, general contractor; 147 tons, bar joists, to Ole K. Olsen Co., New Orleans.

540 tons, factory addition, Lionel Co., Hillside, N. J., to Albert Smith Son, Irvington, N. J.

450 tons, buildings for a classified, government project, to Isaacson Iron Works, Seattle; Atkinson-Jones Co., contractor.

395 tons, plant addition, Driver-Harris Co., Harrison, N. J.; through David O. Evans, to Bethlehem Steel Co.

350 tons, building, Kentile Inc., South Plainfield, N. J., to Elizabeth Iron Works, Elizabeth, N. J.

350 tons, machine assembly plant, Heald Machine Co., Worcester, Mass., to Bethlehem Steel Co.; E. J. Cross Co., Worcester, general contractor.

260 tons, three 3-span WF beam bridges, Montgomery, Vt., to Vermont Structural Steel Co., Burlington, Oscar L. Olson, Montpelier, Vt., general contractor.

200 tons, gateway hoists for Seattle's Ross dam, to Isaacson Iron Works, Seattle.

150 tons, 38-foot single span WF beam bridge and 138-foot, two-span WF beam bridge, Thetford, Vt., to Vermont Structural Steel Co., Burlington, Vt.; Miller Construction Co., Windsor, Vt., general contractor.

### STRUCTURAL STEEL PENDING

1500 tons, Army ordnance depot, Washington state; bids in July 24.

634 tons on which Thomas McQueen Co., Forest Park, Ill., was low bidder on general contract July 16, including: 230 tons, Howard street bridge, Evanston, Ill.; 214 tons, 25th avenue grade separation, Maywood, Ill.; 190 tons, First avenue grade separation, Maywood, Ill.

625 tons, five state bridges, Leominster, Mass.; bids July 24, Boston.

550 tons, power plant, Central Electric Power Co., Chamois, Mo.; bids July 16.

500 tons plus 100 tons reinforcing steel, state bridges, Trenton, N. J.; bids Aug. 2.

350 tons, class room building, State Teachers' College, New Haven, Conn.; Fusco-Amatruda Co., New Haven, low.

276 tons, state bridgework, Snyder county, Pennsylvania; bids Aug. 10.

180 tons, state bridgework, Chester county, Pennsylvania; bids Aug. 10.

125 tons, bridge superstructure, Bowdoinham, Me.; Pittsburgh-Des Moines Steel Co., Pittsburgh, low $63,850, rejected.

100 tons, state bridge, Great Barrington, Mass.

Unstated, outside facilities, railroad tracks, etc., Fort Richardson, Alaska; general award to Morrison-Knudsen Co. and Peter Kiewit Sons Co., Seattle, $7,349,000, by U. S. Engineer.

## REINFORCING BARS . . .

### REINFORCING BARS PLACED

225 tons, auditorium, University of Connecticut, Storrs, Conn., to A. D. Donald Co., Springfield, Mass.; A. E. Stephens Co., Springfield, general contractor.

100 tons, office building, The Texas Co., New Orleans, to Jones & Laughlin Steel Corp., New Orleans; Haase Construction Co., New Orleans, general contractor.

100 tons, addition to St. Helens hospital, Chehalis, Wash., to Northwest Steel Rolling Mills Inc., Seattle; General Construction Co., Seattle, general contractor.

### REINFORCING BARS PENDING

1250 tons, expansion of Rock Island dam, Washington state; bids on two schedules to Stone & Webster, Boston, July 23 and July 27, respectively.

2500 tons, 15½-mile Potholes East Canal, Columbia Basin project; bids to Bureau of Reclamation late July.

Unstated, 5-story hospital, Ladd field, Alaska; general award by U. S. engineer to Grove, Shepherd, Wilson & King, Seattle, $7,536,833.

## PLATES . . .

### PLATES PLACED

850 tons, three tanks, Port Terminal Co., Rensselaer, N. Y., to Hammond Iron Works, Warren, Pa.

### PLATES PENDING

1000 tons plus, penstock, Big Cliff dam, Detroit project, Oregon state; bids soon to U. S. Engineer, Portland, Oreg.

670 tons, 22 storage tanks, above and underground, Eielson air field, Alaska; Morrison-Knudsen Co., Seattle, low $3,198,500.

Unstated, storage facilities and utilities, Ladd air field, Alaska; S. Marci Construction Co., Seattle, low $3,735,000 to U. S. Engineer.

## RAILS, CARS . . .

### RAILROAD CARS PLACED

Chicago & North Western, 250 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

# Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

### Thompson Seeks Butler Plant

Thompson Products Inc., Cleveland, announces proposed leasing of American Bantam Car Co.'s plant and purchase of its machinery. Bantam, located in Butler, Pa., and virtually idle since last year, has petitioned Federal Court in Pittsburgh to approve the Thompson offer. Thompson proposes to pay $240,000 annual rental plus repairs, insurance and taxes and to buy the machinery for $401,000. Bantam has been in bankruptcy since April 18, 1950. Present holdings of Bantam include eight buildings with 325,000 square feet floor space. Bantam is originator of the Army Jeep and did a $10 million per year production job during World War II.

### Navy Awards Barge Contract

Central Steel Construction Corp., Buffalo, will begin work in July on pontoon-type barges for the Navy. This firm also built barges for the military service during World War II.

### Pratt & Letchworth Co.

Pratt & Letchworth Co. Inc., Buffalo, is spending about $500,000 to expand its plant for defense work. A plant addition with 25,000 square feet of floor space is under way. It will house molding, core making and sand handling operations. Much of the equipment will be leased by the company from the government.

### Rotex To Build Factory

Rotex of Canada Ltd. purchased property in Toronto, Ont., where it will erect a $2 million aircraft precision instrument manufacturing plant. Twenty acres of land have been acquired at Eglington avenue and Birchmount road.

### $30 Million Power Plant

Alabama Power Co., Birmingham, will build a $30 million steam electric generating plant at Salco, Ala., 22 miles north of Mobile on the Mobile river. It will initially have a capacity of 250,000 kilowatts with a goal of 1 million kilowatts.

### Federal Ends Creditor Plan

A plan calling for payment of all creditors' claims by June, 1952, and the disbanding of the creditors' committee was put into effect by Federal Machine & Welder Co., Warren, O. Henceforth, the company will confine itself exclusively to the manufacture of welders and presses and closely allied equipment. Federal's backlog of orders totals more than $3 million and shipments are averaging about $500,000 a month.

### To Make Tail Assemblies

Seeger Refrigerator Co., Evansville, Ind., received a multimillion dollar subcontract from North American Aviation Inc., Inglewood, Calif., for manufacture of complete tail assemblies for jet fighters now in production at the planemaker's Los Angeles and Columbus, O. plants.

### Lyon-Raymond Expands

Lyon-Raymond Corp., Norwich, N. Y., producer of electric trucks, will move part of its operations to the Lima Mfg. Corp. plant in Morris, N. Y., because of the need for additional manufacturing space. The company currently is operating 100 hours a week.

### Buys Steel Castings Plant

Curtiss-Wright Corp., Wood Ridge, N. J., plans to purchase the plant of Buffalo Stainless Steel Castings Corp. in Buffalo. Curtiss would use the facilities for production of steel castings for jet engines. Stockholders of the Buffalo firm met July 19 to approve sale of the plant to Curtiss.

### Modglin Enlarges Facilities

Modglin Co. Inc., Los Angeles, is expanding physical facilities by about 50,000 square feet. Metal Products Division, when construction is completed around Sept. 1, will be capable of processing various metal parts and forms for aircraft.

### Reopens Television Division

Stromberg-Carlson Co.'s plant in Rochester, N. Y., resumed production of television and radio receivers on July 16. The company stopped manufacturing television receivers in May, although both the telephone and sound equipment divisions of the plant have been at capacity since January.

### Gets Chrome Plating Award

Marking the first new building designed to house a defense industrial project in Adrian, Mich., Gerity-Michigan Corp., that city, was awarded a defense contract from the Detroit Ordnance District. It will include the erection of a building to cost between $400,000 and $500,000 and $275,000 worth of equipment. The building will be used for

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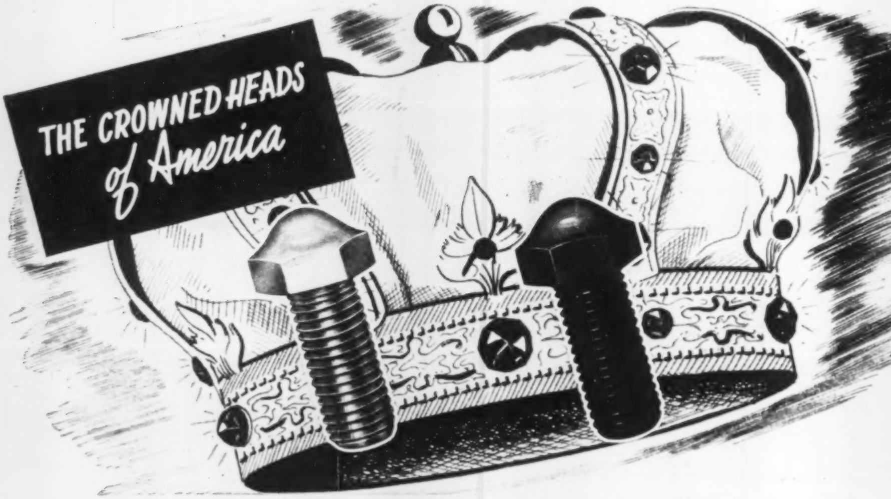
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hard chrome plating of Army cannon tubes.

### Fastener Producer Expands

Construction of an addition to the plant of H. M. Harper Co., Morton Grove, Ill., is under way. The company manufactures nonferrous and stainless steel fastenings. The addition will house facilities for the reduction of copper, nickel, aluminum and stainless steel wire and bar stock; annealing, descaling, pickling and coating equipment.

### Offers European-Made Lathes

Laurens Bros. Inc., dealer and rebuilder of machine tools, Cincinnati, is now the sole American agent for Weipert lathes. These lathes have never been imported to this country before.

### Appleton To Build Plant

Appleton Electric Co., Chicago, will build a $1 million plant in Trussville, Ala. The company manufactures roughing in electrical equipment.

### Buys Canadian Plant Site

Ford Motor Co. of Canada Ltd. exercised options on 427 acres of land in Oakville, Ont., where it is expected the company eventually will erect a large plant for the manufacture of motor cars or parts.

### Southern Alkali Expands

Pittsburgh Plate Glass Co., Pittsburgh, announces expansion of production facilities of Southern Alkali Corp., Barberton, O., a wholly-owned subsidiary. About $11 million will be spent to increase silica pigment output. White soles to camouflage soldier's boots for snow fighting is a big use of the material in the defense program.

### Will Build Enameling Plant

Unit Stove & Furnace Co., North Birmingham, Ala., will build an enameling plant on a site adjoining its present plant. The company's name will be changed to Unit Stove & Enameling Co. The company will do its own enameling and work for other manufacturers.

### Hyster Appoints Dealer

Hyster Co., Portland, Oreg., appointed Freeman & Sons Inc., Miami, Fla., as dealer for its lift trucks, mobile cranes and straddle trucks in south Florida.

### Pressed Steel Buys Firm

Pressed Steel Car Co. purchased Chicago Steel Tank Co., one of the nation's leading specialty tank makers, both of Chicago. The latest acquisition brings to five the number of steel fabricating companies that Pressed Steel has acquired since its product diversification program began 15 months ago. Acquisition of Chicago Steel Tank Co. includes two subsidiary companies: Steel Erectors Inc., which operates as a field installation arm of the parent company, and Conduit Fittings Corp., which makes parts for electrical appliances and systems.

### Parker Appoints Distributor

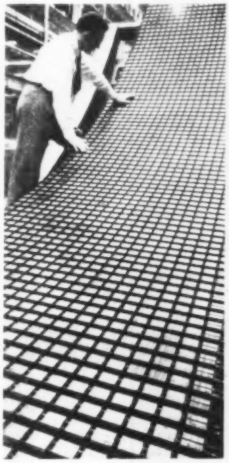
Parker Appliance Co., Cleveland, appointed Neff-Perkins Co., that city, and Allrubber Products & Supply Co., Milwaukee, as distributors for the company's precision aircraft and industrial O-rings.

### Reactivates Riverbank Plant

Norris-Thermador Corp., Los Angeles, will convert and operate a $20 million Army Ordnance plant at Riverbank, Calif., to manufacture steel cartridge cases. Norris-Thermador will perform the engineering services, acquire for government account and install special manufacturing facilities at the plant built in World War II at Riverbank by Aluminum Co. of America to produce aluminum.

### To Improve Stamping Plant

American Radiator & Standard Sanitary Corp., Pittsburgh, announced an improvement program for its stamping plant in Buffalo which will cost close to $2 million. The project includes installation of new metal processing and paint-



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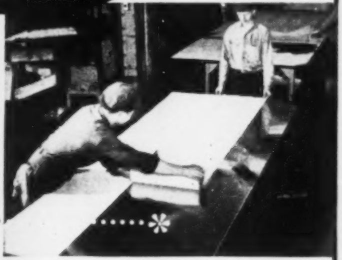

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ing equipment, a conveyor system, new heating facilities and roadways. This is the most extensive single improvement program ever conducted at the plant.

**Keokuk-Metals Expands**

At the request of the Ferroalloys branch, National Production Authority, Keokuk Electro-Metals Co., Keokuk, Iowa, is undertaking an extensive expansion program. A 50 per cent expansion in productive capacity for the Wenatchee Division in Rock Island, Wash., was completed in June. In Keokuk, an additional furnace is being erected, graphite and slag control equipment is to be completed and the raw and finished materials handling facilities are to be rearranged and modernized. Estimated cost of the program at both plants is about $1.7 million. The company manufactures silvery pig iron and ferrosilicon.

**Dunn Steel-Townsend Merger**

Shareholders of Dunn Steel Products Co., Plymouth, Mich., and Townsend Co., New Brighton, Pa. will vote on a merger proposal this week. Dunn Steel manufactures special headed parts primarily for the automotive industry. Townsend is a major producer of rivets, special nails, locknuts and wire products.

**Nice Ball Bearing Co.**

Nice Ball Bearing Co., Philadelphia, completed additions to its plant. One addition enlarges manufacturing space by about 9150 square feet; the other, to be used for storage of raw materials, will cover about 5400 square feet.

**American Control Expands**

American Control Corp., Box 629, Compton, Calif., is constructing a building at 405 East Pine St., that city, for manufacture of automatic controls.

**Will Build Helicopters**

McCulloch Motors Corp., Los Angeles, purchased the plant formerly occupied by Davis Precision Machine Co., 9775 Airport Blvd., to house the firm's Helicopter Division. McCulloch holds Navy contracts for two helicopters and has more under construction.

**Alliance-Western Moves**

Alliance-Western Co. (formerly Stainless Steel Polishing Co.) is moving from 200 North Ave. to a newly constructed building at 4480 Dunham St., Los Angeles. The company is engaged in stainless steel sheet polishing, metal drawings and stampings, manufacture of automatic screw machines and drop forged die inserts.

**Appoints Agent in Venezuela**

Oficina Tecnica Armando Capriles C. A. (Otacca), Caracas, Venezuela, signed a distributorship agreement with Worthington Pump & Machinery Corp., Harrison, N. J., to handle the latter's air conditioning and refrigeration line.

**Allis-Chalmers Opens Branch**

Allis-Chalmers Mfg. Co., Milwaukee, opened a new factory branch last month at 4646 Peachtree St., Atlanta. This branch serves agricultural dealers in Georgia, Alabama, Florida and eastern Tennessee; industrial dealers in South Carolina, Georgia, Alabama and Florida.

**Door Manufacturer Expands**

Butcher Boy Cold Storage Door Co., Chicago, is erecting a $525,000 factory and office building.

**Paine Co. Builds Factory**

Paine Co., Chicago, is erecting a factory building containing 20,000 square feet at an estimated cost of $160,000. The company produces toggle and expansion bolts and metal specialties.

**Cleco Appoints Distributors**

Cleco Division, Reed Roller Bit Co., Houston, appointed Red Arrow Sales Corp., Madison, Wis.; Martin Mfg. Co., Los Angeles; and Knox-Tenn Equipment Co., Knoxville, Tenn., as distributors for its air tools and accessories in their areas.

**North American Aviation Inc.**

North American Aviation Inc., Inglewood, Calif., leased approximately 130,000 square feet of covered floor space at the Fresno Air Terminal, Fresno, Calif., for work on military aircraft. The lease provides an option for an additional 50,000 square feet of floor area for the company's use at a later date if needed. The Fresno plant will get underway in two months on remanufacturing of T-6 Texan trainers and subassembly work for the F-86 Sabre jet fighter airplanes.

**Century Engineers To Move**

Century Engineers Inc., Los Angeles, is erecting a shop building for the fabrication of mockups and prototypes of products designed by the company. Test equipment is being installed to subject prototypes to qualification and final acceptance tests. The company will move from its present location, 2950 N. Ontario, Burbank, to the new location, 2741 N. Naomi.

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From design help to on-schedule completion, Alcoa die-casting facilities are noted for dependability . . . in submitting bids promptly . . . in meeting or beating specifications. Backed by 63 years of aluminum experience, staffed by "old hands" at aluminum die casting, Alcoa's great plants offer unmatched facilities for making your die castings.

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OHIO LOCOMOTIVE CRANES
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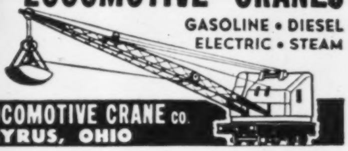

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# MATERIALS--USED EQUIPMENT

## CIMCO SELECT MACHINE TOOLS GUARANTEED

Canedy Otto 21" Stationary Head Floor Drill
Aurora 24" Drill, #4 M.T., tapping attachment
Foote Burt #25 High Duty Drill, #5 M.T.
Avey #2, 2 spindle Drill, #2 M.T.
American 5' 14" col. Triple Purpose Radial Drill
Sellers #1T Tool Grinder, with motor, fully universal
Sellers #6T Tool Grinder, NEW 1941
Landis #2 Universal Grinder, headstock, tailstock, chuck
Cincinnati 10 x 36 Plain Hydraulic Grinder arranged for plunge cut grinding
Landis 26" x 144" External Grinder, complete tooling
Landis 16" x 72" Plain Cylindrical Grinder
Brown & Sharpe #12 Plain Grinder, accurate reversing mechanism
Norton 10 x 24 Plain Grinder
Micro Internal Grinder, Model FG
Landis #6 Precision Thread Grinder, NEW 1944
Nazel 6N Pneumatic Power Forging Hammer

Three Cincinnati 6 x 18 Cylindrical Grinders, Model ER, NEW 1943 Complete with Infeed and precipprocator attachment.

American 16" x 6' Geared Head Lathe, 1¼" hole thru spindle, 12 speeds, first class condition
American 18" x 8' Geared Head Lathe, 1½" hole thru spindle, 27" centers, quick change, all power feed
American 18" x 8' Geared Head Lathe, 8 speed, 1½" hole thru spindle
American 24" x 10' Lathe, 3 step cone drive, double back geared, 1½" hole thru spindle
American 30" x 32' Geared Head Lathe, 12 speed, 2½ hole thru spindle 26' centers
American 48" x 20' Geared Head Lathe, 16 speed 2⅝" hole thru spindle, first class
American 16" x 16' Geared Head Lathe, 1¼" hole thru spindle
Porter McLeod 16" x 8' Geared Head Lathe, 1⅝" hole thru spindle, 12 spindle speeds, NEW 1941
Monarch 16" x 8', 3 step cone drive, double back geared
Lodge & Shipley 18" x 6' Geared Head Lathe, 12 speed
Lodge & Shipley 20" x 8' Selective Geared Head Lathe, 12 speed
Cincinnati #1-18 Plain Horizontal Miller, power rapid traverse to table only
Ingersoll 42 x 36 x 12 Miller, 4 head adjustable rail
Milwaukee #3B Universal Miller double overarm, power feed in all directions, working surface 55" x 15"
Brown & Sharpe #4A Univ. Miller, all geared feeds, power rapid traverse
Gray 24 x 24 x 6' Planer, countershaft drive, 1 head on rail
Cleveland 26 x 26 x 8' Openside Planer, 1 rail head, 1 side head
Gray 36 x 36 x 12' Double Housing Planer, 2 swivel head on rail

Gray 42 x 42 x 12' Double housing Planer, NEW 1941, 75 HP motor, Box bed, 2 rail heads, 2 side heads with tool lifters with each head. First Class Condition

Barnes Two Spindle, Horiz. Deep Hole Drill and Boring Machine, Model 420

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| 25,000# | 3/4" Hex C.D. B-1112 or Any Free Machining Grade |
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| 49,000# | 1 1/16" Hex C.D. B-1112 or any Free Machining Grade |
| 42,000# | 1 1/4" Hex C.D. B-1112 or Any Free Machining Grade |
| 38,000# | 1 7/16" Hex C.D. C-1115 or Any Free Machining Grade |
| 30,000# | 2 1/4" Hex C.D. C-1115 or Any Free Machining Grade |
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## SURPLUS EQUIPMENT FOR SALE

2—10-Ton Bottom Blown Converters with spare bottoms, jack cars, slag cars and boxes, bottom ovens, and bottom-making mud mills. Built by Pennsylvania Engineering Works.

4—132" Cupolas with skip charging equipment and Roots Connersville blowers and motors (350 HP) and controls.

4—10,500 C.F.M. @ 25# P.S.I. Ingersoll-Rand motor-driven Air Compressors for blowing converters.

2—Milwaukee Briquetting Presses with electrical equipment.

6—American Crushing Mills for turnings, with motors.

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All above equipment in practically new condition.

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## ROLL FORMING MACHINERY

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36 to 40 inch roll former 12 stand.
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Yoders or equivalent, automatic cutoff desired.

22 gauge by 12 to 14 ft. Corrugating Machine, complete with electrical equipment.

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## 2000 Tons Good RELAYING RAIL

70 — 72 — 75 — 85
100 pound
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IMMEDIATE DELIVERY

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*STEEL & MACHINERY*

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New Haven, Conn.

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# MATERIALS--USED EQUIPMENT

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### STANDARD GAUGE FREIGHT CARS

Box, Single Sheathed, 40 & 50-Ton
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Gondolas, Composite, 50-Ton and 70-Ton
Hoppers, Covered, All-Steel, 50-Ton & 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Tank, 8,000-Gallon, Class II

### EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

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End Dump, 20-Yd., 50-Ton, Drop Door
End Dump, 10-Yd., 30-Ton, Lift Door
Side Dump, 16-Yd., 40-Ton, Lift Door
Side Dump, 20-Yd., 40-Ton, Lift Door

### STANDARD GAUGE LOCOMOTIVES

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Propane-Electric—70-Ton
One 50-Ton H. K. Porter, Saddle Tank, Type 0-4-0, Oil-Fired, Steam, Built 1942

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6,000 Gallon
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**Confidential**

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**RESEARCH DIRECTOR, METALLURGICAL** chemist with broad experience in metal finishing, electroplating, corrosion, ferrous and nonferrous metallurgy, and quality control; seeks equivalent position. Write Box 334, STEEL, Penton Bldg., Cleveland 13, O.

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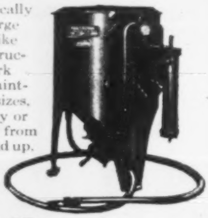
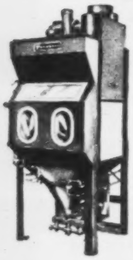
**Blast Cleaning Unit is PORTABLE!**

Economically cleans large objects like tanks, structural work before painting. Six sizes, stationary or portable, from $170.00 and up.





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Liquid blast holds tolerances to .0001", reduces costly hand polishing, cleaning and finishing of molds, dies, tools, etc. Models from $1295.00 and up.

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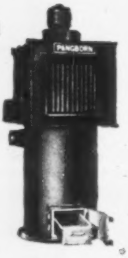
Pangborn industrial type Unit Dust Collectors trap dust at source. Solve many grinding and polishing nuisances and material losses. Models from $286.00 and up.



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UTILITY BLAST CABINET

Ideal for cleaning pieces up to 60" x 36". Cleans metal parts, removes rust, scale, grime, dirt, paint, etc., in a few seconds. Models from $315.00 and up.

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**Pangborn**

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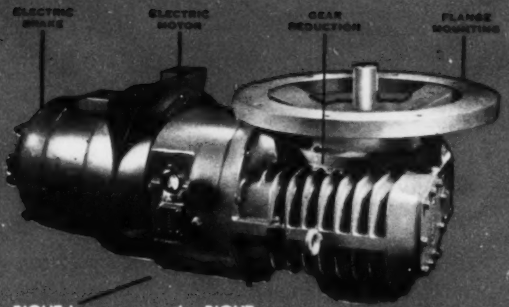

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Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you an enormous selection of integrally built power drives from which you can easily select the combination of features that's just right for each job.

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Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

**THE MASTER ELECTRIC COMPANY**
**DAYTON 1, OHIO**

**MASTER GEARMOTORS**

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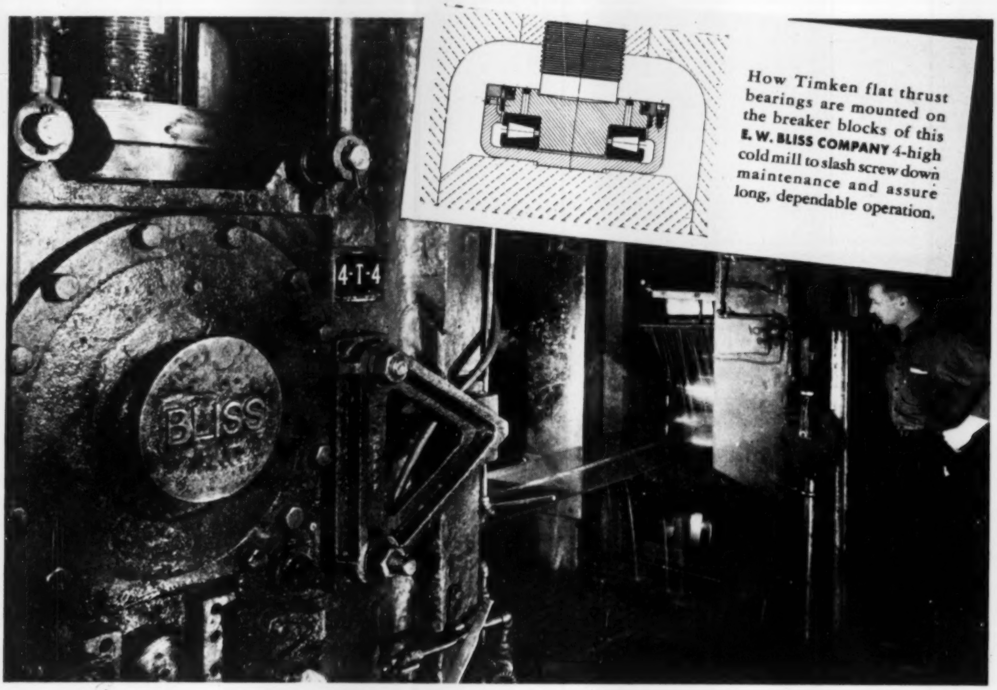
By switching to Timken® bearings in the breaker blocks of this Bliss 4-high cold mill, screw down maintenance has been virtually eliminated. Timken flat thrust bearings take the heaviest loads of the screws with minimum friction. Motor overload is drastically reduced, assuring quick and uniform screw down response. There's no stripping of worm gears, no costly time-outs for lubrication.

Because of line contact between rollers and races, Timken bearings have extra load-carrying capacity. The on-apex construction of Timken thrust bearings assures true rolling motion and eliminates slippage between rollers and races. This feature plus an incredibly smooth surface finish practically eliminates friction.

No other bearing can give you *all* the advantages you get with Timken tapered roller bearings. Make sure you have them in all the mill equipment you build or buy. Always look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*



How Timken flat thrust bearings are mounted on the breaker blocks of this **E. W. BLISS COMPANY** 4-high cold mill to slash screw down maintenance and assure long, dependable operation.

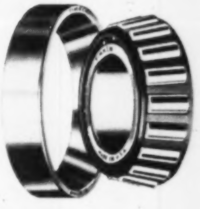
**DESIGN LEADERSHIP**

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

***TAPERED ROLLER BEARINGS***